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AMERICAN
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FIFTY-EIGHTH YEAR

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# NOTHING CAN BE HIDDEN IN THE PAGES OF THE AMERICAN GAS LIGHT JOURNAL

## Even the Most Insignificant News Item is Read

IN one week's issue there was a small space that had to be filled. There was no item set up in type that would fit in. Time was at a premium. The presses were waiting. In searching around for an item that would be suitable, the editor's eye was caught by a striking phrase. He used it as a heading over an item that reflected on the reliability of electric lighting service. The result was a controversy. It was a meaningless, insignificant little item, but **it was read.**

¶ If our contracting news department happens to overlook a slip-up on the part of the printer, which places a certain town in "Pa." instead of "Va.," we are certain to receive several inquiries as to the locality of that town.

¶ These are but a few of many similiar instances that occur in the course of a year, which goes to prove that **from cover to cover**

## The American Gas Light Journal Is Thoroughly Read

¶ Among our subscribers is the

## Buying Power of the Gas Industry

¶ If they read our text pages so closely, is it not likely that

# THEY WILL READ YOUR ADVERTISEMENT


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ADVERTISERS' INDEX, PAGE 20

# KOPPERS

## BY-PRODUCT COKE AND GAS OVENS

The most efficient method of carbonizing coal is in KOPPERS OVENS and the best coke and by-products are produced by this process.

## H. KOPPERS COMPANY

Pittsburgh, Pa.

Builders of

By-Product Coke and Gas Plants
Tar Distilling Plants
Ammonia Recovery Plants
Benzol Recovery Plants

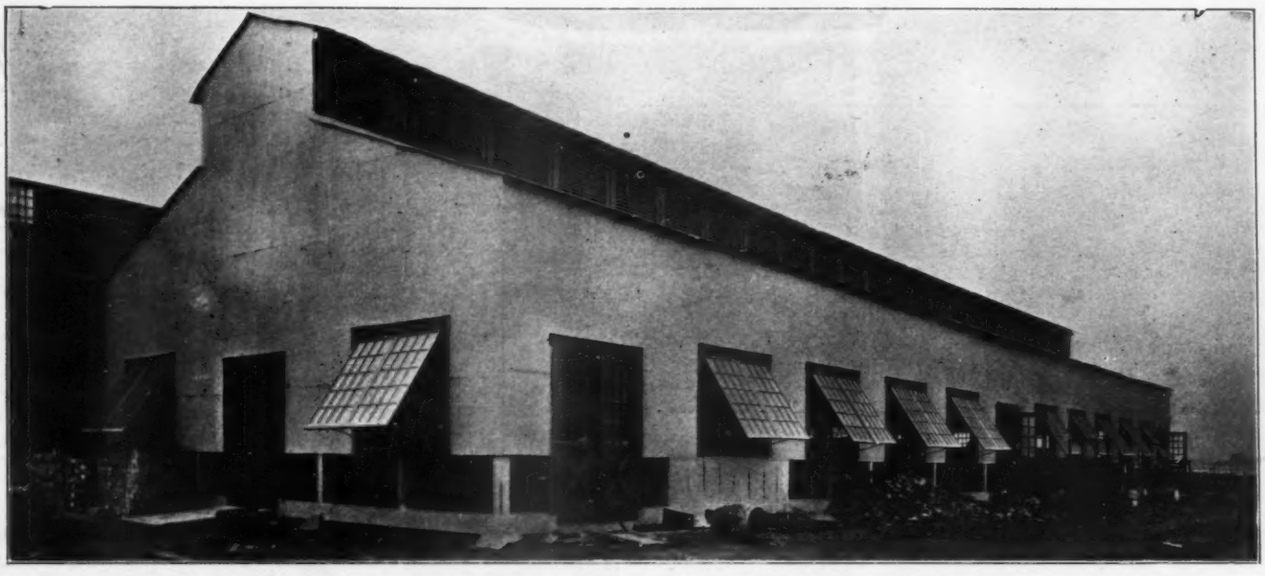
**Exhibitors at the Second National Exposition of Chemical Industries, Grand Central Palace, New York City, Week of September 25th.**

1859 FIFTY-EIGHTH YEAR 1916

AMERICAN

GAS LIGHT JOURNAL

VOL. CV., No. 8. NEW YORK, AUGUST 21, 1916 WHOLE No. 3,050.



HEAT TREATMENT BUILDING, WHICH HOUSES WHAT IS BELIEVED TO BE LARGEST GAS INSTALLATION OF ITS KIND EVER MADE

# Largest Manufactured-Gas-Fired Furnaces, in Operation, Show Decided Economy Over Fuel-Oil-Fired Installations

**Furnaces at Eddystone Ammunition Corporation Plant Will Consume 237,000 Cu. Ft. of Gas Per Day—Cost of Gas 43 Cents per Thousand Cubic Feet, as against 4½ Cents per Gallon for Fuel-Oil—One Man Located in Central Control Pulpit Regulates All Furnaces—Many Advantages Over Fuel-Oil Installations**

In what is believed to be the largest artificial gas-fired furnace installation, gas at a cost of 43 cents per thousand cubic feet was, after careful consideration, selected in preference to fuel-oil costing 4½ cents per gallon. Since the installation the costs of operation of the various units have proved conclusively that the former—as previous studies indicated—is the most economical fuel. The furnaces are used for the hardening and tempering of 3-in. shells in the Eddystone, Pa., plant of the Eddystone Ammunition Corporation. Each unit is designed to turn out 5,000 shells in a period of 20 hours. The full capacity of the installation is 15,000 shells per day. One man, located in a central control pulpit, can easily operate all of the furnaces.

### Gas Delivered and Metered Under 25 lb. Pressure

The installation consists of three hardening furnaces and three tempering furnaces, two of each of which are already in operation, and the others, at present, under construction. Each furnace is approximately 22 ft. long, by 8 ft. wide, by 7 ft. high, outside dimensions. They are arranged in units, one hardening and one tempering furnace comprising each unit, and each is designed to turn out 5,000 shells in a 20-hour day, making the full capacity of the three units 15,000 shells per 20-hour day. The furnaces are fired by the Surface Combustion High Pressure System, a process whereby gas under pressure is made to inspirate the air necessary for complete and perfect combustion, which maintains, automatically, constant mixture proportions and eliminates motors, blowers and air piping.

It is a one pipe system, and capable of control from a central control pulpit. Five hundred and eighty British Thermal Unit gas, supplied by the Philadelphia Suburban Gas & Electric Company of Chester, Pa., is used for fuel. This is delivered and metered under a pressure of 25 lb. A Rotary Pressure Meter and a Bailey Flow Meter are used for measuring purposes.

Each unit consumes an average of 3,300 cu. ft. of gas per hour, and turns out 240 shells in that period. When all the units are running at capacity, 9,900 cu. ft. of gas per hour will be consumed. As the furnaces are kept hot during the entire 24 hours, though shells are being turned out during only 20 hours, the gas consumed per day will amount to 237,000 cu. ft., and for 300 days, approximately 70,000,000 cu. ft.

The gas is purchased on a sliding scale rate, at approximately 43 cents per thousand cubic feet.

The hardening is done at an average temperature of 1,500 deg. Fahr., and the tempering at an average temperature of 1,100 deg. Fahr. Each shell is in each furnace for a period of approximately one hour. The shells are 3 in. in diameter, and about 8½ in. long. They vary in weight from 8 to 11 lb. The furnaces are operating at an average efficiency of 32 per cent, furnace efficiency being the percentage of available heat units in the fuel consumed, which are actually absorbed by the work being done; in this case, heating steel.

### Central Control Effects Considerable Saving in Labor Cost

Eight steel angles, which act as troughs to carry the shells, run through each furnace. An air cylinder with an arm attached to the piston rod acts as a pusher. A man stands in front of each furnace and feeds shells into the trough.

Every two minutes the pusher pushes the shells ahead the length of each shell. This causes eight to discharge into the oil-quenching bath, located at the discharge end of the hardening furnaces, from which they are taken when sufficiently cooled, and

REAR END OF TEMPERING FURNACE

**Air Cylinder with an arm attached to piston rod acts as a pusher in carrying shells through furnace. From this furnace the shells push out of tubes every two minutes. Flap covers on tubes keep out air.**

fed into the tempering furnaces in exactly the same manner. The furnaces are built on a slight slope.

All the furnaces are controlled from a central control pulpit, each being governed by a single valve, which regulates the pressure supplied.

The maximum pressure is 25 lb. and the minimum 5 lb. The average operating pressure is 15 lb.

All pyrometers, both indicating and recording, are located in the central control pulpit. This allows one man to easily operate all of the furnaces, a feature that has resulted in a considerable saving of labor, as in a number of cases as many as eight men have been necessary to care for burners and the control of temperatures on a similar number of furnaces of the same size fired by oil. This feature also allows a much more accurate and careful control, as is evidenced by the practically straight-line pyrometer charts which are secured daily.

### Control Pulpit is the Brains and Heart of the Heat-Treating Building

An electric flasher which times the charging operation is also located on the central control pulpit. This flashes a red light in front of each furnace every two minutes, this being the signal for the men to operate the pushers. The furnace operator in the control pulpit, at the beginning of each shift, is given temperature and time instructions, and is able to follow them with the greatest accuracy without moving a step. The central control pulpit is the brains and heart of the heat-treating building—clocks, bells, etc., all being located there.

The furnaces are encased in cast-iron castings, tied together by heavy tie rods, and are mounted on concrete foundations.

The heavy fire-brick linings are backed up by Sil-O-Cel, which gives ample insulation, and cuts down the radiation losses, and protects the operators from the heat. This latter feature is a point that is greatly appreciated in hot weather.

The furnaces are as air-tight as it is possible to make them. To prevent the entrance of cold air, which would produce an oxidizing effect, and, by its cooling action, lower the furnace efficiency, a slight furnace back pressure is maintained. The furnaces, as is a common point with all Surface Combustion furnaces, are designed to develop and utilize the maximum possible amount of radiant heat. The flues are arranged to distribute the hot gases uniformly, and to release them at the lowest possible temperature.

The hardening furnaces are equipped with 22 high-pressure burners, and the tempering furnaces with 18. All piping is laid in conduits, having removable covers, thereby eliminating all over-head work. The largest pipe used is a 2-in. diameter pipe. Each burner is fed by a ½-in. pipe, from a 1-in. manifold.

### Furnaces Installed in the Face of Competition of Fuel-Oil Costing 4½ Cents Per Gallon

Frequent flue gas analysis has shown the oxygen contained to be zero, carbon monoxide zero, and an average of 15.2 carbon dioxide. This indicates that the heat is generated with a 100 per cent efficiency, it having no excess air or unburned gases.

For the purpose of minimizing the scaling of the shells, and to lengthen the life of the angle troughs, the furnace is operated with a slightly reducing atmosphere—carbon monoxide reading between 0.3 and 0.5. This is done to be on the safe side, as an oxidizing atmosphere would be injurious to the operation.

The furnaces were installed in the face of the competition of fuel-oil costing 4½ cents per gallon. Several oil-fed furnaces of practically the same size, and doing the same work, were in operation prior to the installation of the gas-burning furnaces.

One of the oil-fired furnaces was carefully tested over a period of several days, the oil being measured in a calibrated tank.

Subsequent tests of the gas-fired furnaces have proved conclusively, as was indicated by the tests made previously, that the

FRONT END OF HARDENING FURNACE—VIEW SHOWS SURFACE COMBUSTION HIGH PRESSURE BURNERS AND PIPING SYSTEM

operating cost of the gas-fired layout is considerably lower than that of the oil.

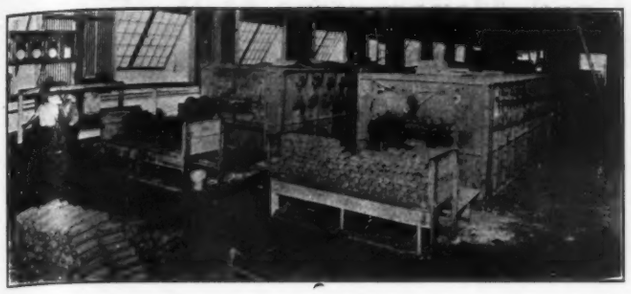
A great advantage of gas-fired equipment for installations of this kind as against oil-fired installations, is that in the initial cost of the installation, gas-fired equipment, similar to that used on this work, can be installed at a cost fully 30 per cent less than the cost of the necessary equipment, including furnaces, for an oil-fired installation.

### Advantages of Surface Combustion High Pressure Gas Process over Oil-Fired Equipment

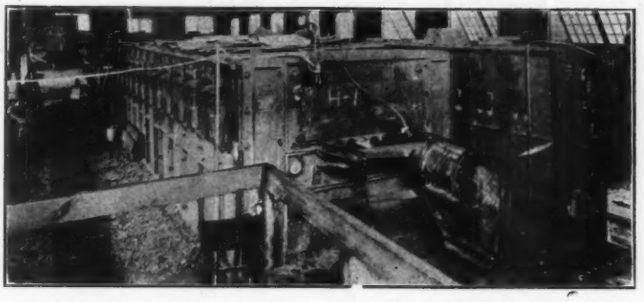
Gas-fired equipment of the kind herein described has the following advantages over oil-burning equipment:

High overall efficiency.

Lower capital investment—no storage tanks, pumps, oil lines, steam lines, meters, blowers, air pipe, and electrical equipment being necessary.



CENTRAL CONTROL PULPIT WITH INDICATING AND RECORDING PYROMETERS IN LEFT BACKGROUND



RED FLASH LAMP IN FRONT OF FURNACES TIMES CHARGING OPERATIONS

No capital invested in stored fuel, the cost of fuel being paid for after using, not before.

A clean shop and no fumes, with a consequent increase in production.

Price of fuel not subject to almost daily fluctuations, and when it does fluctuate, the course is generally downward.

The availability of the fuel supply.

Control of temperature and furnace atmosphere.

Uniformity of production.

Ease in operation of lighting.

Decreased fire hazard.

Minimum amount of clerical work.

Increased capacity per unit obtainable, if desired.

Constant composition and calorific value of fuel.

Less attention required for operation.

Increased life of equipment, especially of brick work.

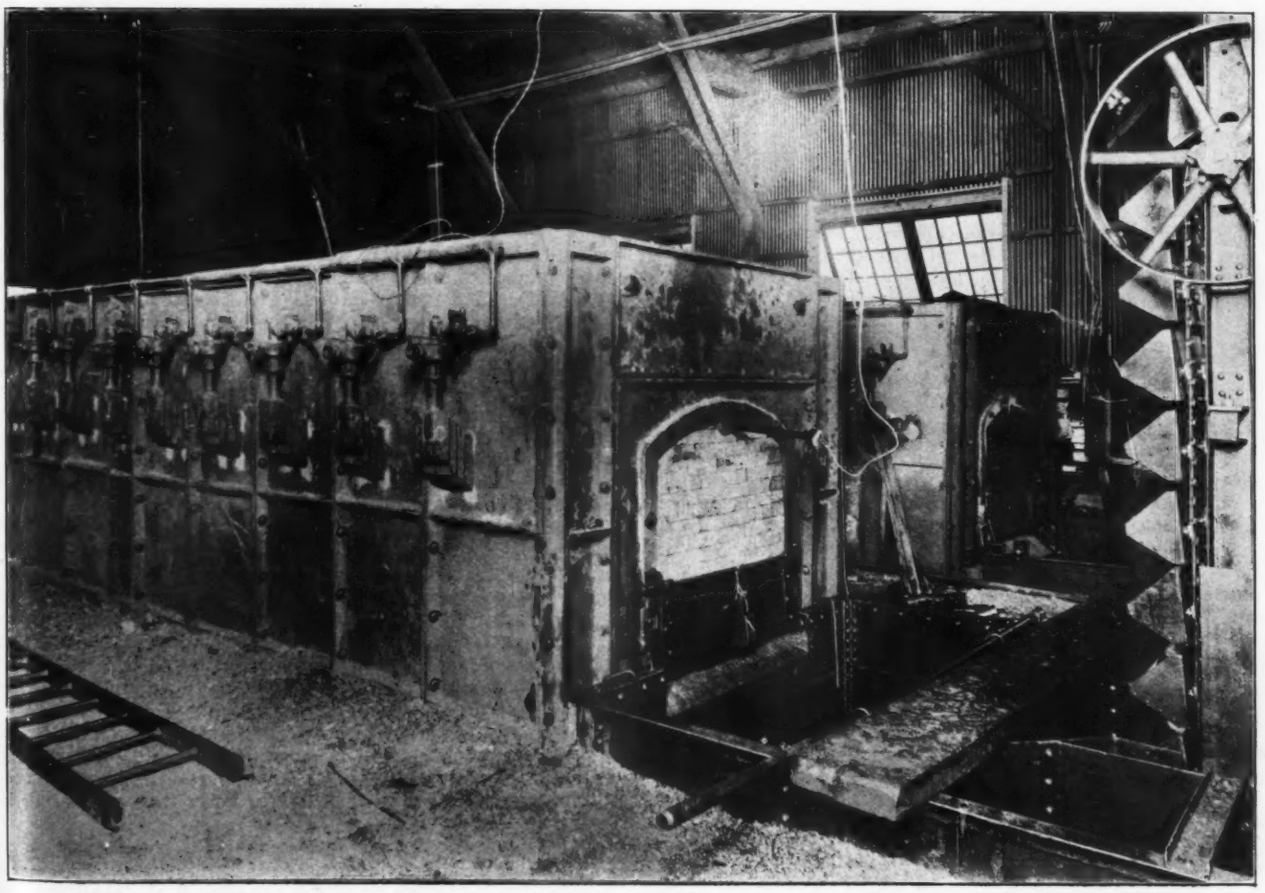
The furnaces herein described were engineered, designed and installed by the Surface Combustion Company of New York City.

## Gas Rates Raised at Colorado Springs

Gas consumers in Colorado Springs will find a small increase in their gas bills Sept. 1, as a result of an order issued, Aug. 7, by the Colorado Public Utilities Commission. The rates, effective Aug. 1, are $1.15 gross and $1.10 net instead of $1.10 gross and $1 net as heretofore.

The commission's ruling was made upon the application of the Colorado Springs Light, Heat & Power Company for an increase to $1.35 gross and $1.25 net. The commission's investigation showed that the gas utility is not paying a fair interest on the investment and that if the tariffs were increased to a point that would make the service profitable to the company the expense to consumers would be exorbitant.

This is the first instance wherein the utilities commission has granted an increase on the application of a corporation following a public hearing and, according to a statement by one of the commissioners, it is "predicted upon the supposition that the company will properly develop its property and will render adequate service. To insure this," it is added, "the commission has instructed its engineering department to make inspections from time to time and report thereon."



REAR END OF HARDENING FURNACE—ELEVATOR CONVEYOR REMOVES SHELLS FROM OIL-QUENCHING TANK

# Care in Selection of Employees and Good Management Methods Have Increased Factory Output 42 Per Cent in Five Years

**Average Wages Have Increased 37 Per Cent, Yet Cost of Production Has Decreased About 10 Per Cent—Activities of Company Reach Out Beyond the Factory, and into the Homes of its Employees—Happiness and Contentment of Workers Sought Above all Else**

For five years the Joseph & Feiss Company of Cleveland, Ohio, has conducted experiments in selecting its employees, and in bringing them up to their highest efficiency, once they are employed. The results have been a reduction in the hours of labor from 54 to 48 per week, an increase of 37 per cent in the average wage, a 42-per cent increase in the output of the factory, a decrease in the production cost of about 10 per cent, and a 33-per cent reduction in the labor turnover. Robert T. Kent, in a recent article in the *Iron Age* describes the experiments as follows:

### Company Has Progressed Further Along These Lines Than Any Other in Country

In the welfare work which has been started, and in the development of scientific methods of employment, which is necessarily a part of scientific management, the Joseph & Feiss Company has probably progressed further than any other concern in the United States. The net result of its efforts in these two lines is a reliable, stable and highly efficient labor force.

In 1910, on a standing payroll of 1,044 employees, there were hired 1,570 new hands; a labor turnover of 150 per cent.

In 1914 the progress in the adoption of the methods outlined below had reduced the number of new hands to 290 on a standing payroll of 865, or a labor turnover of 33 per cent. Notwithstanding a decrease in the payroll, the product of the factory was materially increased by reason of the increase in the efficiency of the employees, due to the methods of scientific management.

The manager of the concern, Richard A. Feiss, has somewhat radical ideas upon the handling of labor. His attitude toward employees is distinctly paternalistic. Every prospective employee is interviewed personally by him, and, at the interview, the ideals of the shop are explained and an outline is given of the methods of management carried out in the factory, and the reason for these methods as they affect the employees.

No employee can be discharged without the justice of the discharge being certified by the manager. Thus, every employee who feels that he or she may have a grievance is absolutely certain that this grievance will be heard and judged at the court of last resort in the factory before being disposed of.

### Employment and Service

For the purpose of administering the function of the employment and welfare work, there has been established an employment and service department, which is considered one of the most important adjuncts of the management. All applicants for positions first come in contact with one of the heads of this department, and information concerning each applicant is entered upon a suitable blank.

English-speaking applicants are given the preference, but desirable employees are not rejected because they do not understand the language.

They are, however, required to attend one of the classes in English, which form a part of the factory service for its employees.

It is stated that it is difficult to impart instruction to, and obtain the desired standards of output from those who do not speak English. Out of 35 employees whose knowledge of English is imperfect, only one has obtained an efficiency equal to that of the best worker of the same class of work.

The wage contribution to the family is obtained for several reasons. Other things being equal, preference is given to those who have to support themselves, or whose contribution to the family support is necessary. Where an entire income is contributed to the family support, the efficiency of the worker, is, as a rule, found to be materially lower and no incentive is present for the worker to improve. In such cases a visit to the home is made by a member of the service department, and an arrangement is established whereby a definite contribution to the family support is made, the balance being retained by the employee. Numerous instances might be cited to prove the efficiency of this method. For instance: The earnings of an employee were almost immediately raised from 13 to 22 cents per hour upon piece work by this arrangement.

The record of previous employment is obtained principally to indicate whether or not the applicant is what is known as a "floater" in the industry. The information is not considered of any particular value for purposes of reference and is never so used. Wherever possible, applicants give as their reference members of the factory organization.

### Hiring the Employees

Applicants are not hired at the time they make their first application, nor is any immediate decision arrived at regarding their suitability for employment. Decision is deferred for one or several days in order to bring all applicants in their proper relationship in the mind of the one who finally is responsible for their selection. Postponement also tends to reduce the number of floaters appearing on the payroll.

Application records are classified as to age, sex and apparent suitability. When a position is to be filled, several of the applicants whose records have already been obtained, are sent for, a definite time being set for their appearance. Enclosed with the notification are self-addressed postals which the applicant may use if it is impossible to keep the appointment at the time stated. At this second interview selection for immediate employment is made, and the suitability of the prospective employee is more definitely determined.

### Physical Examinations

The better the health of the worker, the higher will be the efficiency, other things being equal. Consequently, effort is made not only to select workers whose health is good, but to maintain them in perfect health so long as they are members of the organization. A complete medical department, therefore, forms a portion of the equipment of the factory, a graduate nurse being in charge of the work. A dispensary, separate rest rooms, a waiting room and consultation room for the factory physician comprises the equipment of this department. The medical staff consists of a physician, oculist and dentist; the physician spending three mornings per week at the factory, the oculist two mornings and the dentist one morning.

All medical work at the factory is at the expense of the company. If medical attention outside the factory is required, it is at the employee's own expense save in exceptional cases where the employment and service department recommends that the expenses be borne by the company. Arrangements have been made by the company whereby this medical and dental service is secured outside at special rates. New employees are subjected to physical examinations and the time of their appointments with the employment and service department is regulated so as to coincide with the physician's visit. In regard to eye examinations of new employees, a preliminary examination is made by the nurse to discover any obvious defects. The oculist later makes a very thorough examination and if glasses are found to be necessary, prescribes them. Arrangements have been made whereby glasses can be obtained from reliable opticians in the city at one-half the usual rate.

The dental examination is also regarded as of supreme importance, in that many chronic cases of headache, neuralgia or stomach trouble have been directly traced to neglected condition of the teeth or to poor dental work already done. Less than 15

per cent of the employees were found to have teeth that were properly cared for and in good condition; and it is stated that this percentage is considerably better than the average among employees in factories in Cleveland. A chart is made of the defective teeth and is given to the employee, together with an estimate of the cost of the work needed. No dental work is done at the factory excepting examination, advice and prophylaxis.

Information obtained from the medical, ocular and dental examinations is entered upon record cards. Not only is the applicant thoroughly examined at the time of the appointment, but this work is followed up from time to time.

### Determination of Mental Fitness

In addition to the physical tests described above, certain simple tests are made to determine the mental fitness of the applicant. These are to determine both his capacity for certain kinds of work, and also the general fitness for advancement which depends, to a certain degree, upon mental fitness. Tests that are being developed under the direction of Prof. Walter Dill Scott of Northwestern University, include a test for the ability to follow instructions and a series of tests for dexterity.

No matter how much care is exercised in the selection of workers, errors are bound to occur. Workers are often placed at jobs for which they are not suited, and some are selected who are unfit mentally for the industry. The aim is to use these tests to aid in the selection and to avoid placing either normal or sub-normal persons at work for which they are unlikely to prove adapted.

The second purpose of the tests is to minimize errors in promotion. In the factory under consideration, a large percentage of the organization is moved up during the course of a year, it being the policy to fill positions of clerical or executive natures, in fact positions of every kind, by advancement. In the past, many mistakes have been made by advancing individuals to positions beyond their mental capacity. Eventual reduction in position resulting from this improper advancement is humiliating to the individual and often causes his loss to the organization. In addition, the organization has suffered by reason of a position being poorly filled. The tests are expected to minimize errors of this nature.

It is impressed upon all that the tests just described are for inherent intelligence and not for education or character. The fact is emphasized that such tests cannot determine what a person can do but can help in determining what he cannot do. It is recognized that physical and psychological tests can be made instruments of abuse and that care must be exercised to see that they do not eliminate a large proportion of the community which, while not normal physically or mentally, must be used to assist in saving by the scientific selection every person capable of productive effort.

### Welfare Work Outside the Factory

Interest in the health of the employee does not cease with the hiring of him, but continues throughout his connection with the organization and extends beyond the bounds of the factory into the home. As soon as possible after an employee is hired, a member of the service department visits the home and investigates conditions there. It is often found that influences in the home are contrary to the influences of the factory and that if the highest efficiency in his work is to be obtained by the new employee, bad influences in the home must be corrected.

Thus, unhygienic home conditions would counteract all conditions for health established in the factory. In many cases, it has been found among new employees that the practice of sleeping four or five in a room with the windows tightly closed was responsible for dullness, headaches and other disorders which affected the worker's ability. Sound advice and constant follow-up of such cases on the part of the employment and service department correct such conditions and have a marked effect in improving the efficiency and *esprit de corps* of the factory force. Also family troubles, financial and otherwise, are often detected and remedied in these home visits.

The company makes no excuses for its practice of "invading the privacy of the home," as it is often termed by objectors to these methods. It holds that the object of the company is to make money and that this can best be done by a happy, contented and efficient working force. The employee spends but eight hours out of the 24 in the factory, and his efficiency is vitally affected by what he does, or influences to which he is subjected during the other 16 hours. Happiness and contentment of the employee are more often than not the result of conditions outside of the factory, and the company believes that by taking some cognizance of these conditions it can materially increase the health and happiness of the employees, and therefore their efficiency in the factory. The results that have been accomplished bear ample testimony to the soundness of these ideas.

The employment and service department is not regarded by the employees as meddlesome or interfering with their liberties and pleasures. On the contrary, employees look upon the members of this department as friends to whom they can go at any time for advice upon any subject whatever, whether it has to do with their work in the factory or their affairs outside of it. As a matter of fact about one-fifth of the entire working force consults the department every day.

### Working Conditions

Of the working conditions existing in the factory it is hardly necessary to speak. It goes without saying that a factory which [illegible] ideals of this one will necessarily furnish the best [illegible]ions possible. It is sufficient to say that the shop proper is splendidly lighted, well ventilated and kept scrupulously clean. Chairs are provided for all workers and every facility has been adopted that will minimize fatigue. In addition to providing working facilities of the highest order, the company has also provided facilities for rest and recreation. The entire basement of the factory building is given over to this purpose. Shower baths are installed here for the employees and in addition there is a large dining room in which the employees can eat lunches which they have brought with them or they can obtain prepared lunches from the factory kitchen, practically at cost. Nearly all of the employees avail themselves of this privilege. The remainder of the basement is given over to a recreation floor on which dances can be held or games played, and these facilities are used to the limit every noon and after working hours. A branch of the Cleveland Public Library is maintained in the employment department and is well patronized. A savings bank conducted by the company for its employees is another institution that is well patronized.

The spirit of democracy pervades the entire establishment. The office force is regarded as being no better or no worse than the factory force. They keep the same hours, have the same privileges and obey the same rules as do the workers in the shop. They also use the same dining room.

An extensive sociological experiment such as has been conducted in this factory can be judged only by its results. The results in this instance have proved to be highly satisfactory. The low labor turnover has already been mentioned. One or two other results are worthy of attention. In presenting these results, however, it should be borne in mind that they are not due solely to the service work which has just been described, but to the applications of the principles of scientific management of which the service work forms only a part, albeit a highly important one.

In the five years in which this experiment has gone on, the hours of labor have been reduced from 54 to 48 per week. The average wages per week have increased 37 per cent. The output of the factory has increased about 42 per cent, while the cost of manufacture has decreased about 10 per cent. It is thus evident that from the standpoint of both employer and employee, the experiment has been a success, financially, physically and morally.

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## Bolt of Lightning Starts 1,500,000-Cu. Ft. Flow of Natural Gas

An oil well belonging to the Harbison & Walker Company, at Hays, Pa., long classed as a non-producer, started flowing, July 30, as a result of a bolt of lightning.

The well was brought in last winter, but the flow lasted only a short time. During a big electrical storm a bolt struck the derrick, and set it on fire.

When the fire department attempted to extinguish the flames, it was found that a heavy flow of gas was coming from the well. After much difficulty this was diverted into a feed pipe, and is now going through the meter at a rate of nearly 1,500,000 cu. ft. every 24 hours.

# Maximum Returns Cannot Be Expected From Gas-Electric Plants If Lighting is Neglected

**J. P. Conroy Declares that Unless Such Companies Divide the Lighting Load Between Gas and Electricity Both Ends of the Business Are Certain to Suffer—Lighting Still Constitutes Almost 50 Per Cent of Gas Business, Despite Adverse Conditions**

"There probably was no business in North America resting upon a firmer foundation than the business of gas lighting," declared J. P. Conroy, manager of the General Gas Light Company, of New York City, in his paper on Gas Lighting Service, presented at the annual meeting of the Canadian Gas Association, held in Quebec, Aug. 16-17. "In this business there has been no mushroom growth. It has never been extensively advertised or aggressively pushed. For the first seventy years, from 1816 to 1886 there were no fundamental improvements in the system of lighting."

### Welsbach Mantle Did Not Meet with Very Enthusiastic Welcome from Gas Companies for Many Years

For many years the Welsbach lamp did not meet with a very enthusiastic welcome from gas companies. The first mantle burners were sold by jewelry stores, plumbers, etc., rather than by gas companies. Some gas companies even went so far as to try to prevent the sale of these more efficient burners. They feared that their introduction would reduce the gas revenue.

Since 1886 all that has been done in gas lighting has been to further develop the discovery of Welsbach. Just before the present European war broke out, there were rumors that discoveries had been made by German chemists that promised to revolutionize gas lighting.

### Gas Companies as a Rule Have Never Made Serious Attempts to Sell Gas Lights

Gas companies, as a rule, have never made serious attempts to sell gas lights.

In the old days they were satisfied to make the gas and let the people come to them to buy it.

In many cases they were hardly civil to their customers.

They apparently felt that courtesy was beneath their dignity, and that it was a great condescension on their part to allow the consumers to buy gas.

In spite of this unbusiness-like procedure, in those cities and towns having a gas supply, gas lighting was rapidly displacing all other forms of lighting by the time the incandescent gas burner had been perfected.

Since 1886, however, electricity has grown to be a keen competitor, and in spite of the cheaper and better light by the use of gas, the gain in gas lighting has not been proportionately as great as electricity.

This condition is due to the fact that electric lighting companies have endeavored to give real lighting service, by not only advertising and pushing the sale of electricity for light, but by carefully supervising each installation, and, in the majority of cases, by supplying free renewals of carbon filament incandescent lamps, and, in the days of inclosed electric arcs, in nearly all cases those lamps were supplied and installed and maintained for customers without extra charge. Many electric companies to-day are supplying free renewals of Tungsten lamps of certain size.

Had the gas companies adopted the incandescent gas lamp thirty years ago, and given the same attention to supplying a real lighting service rather than to making and to selling gas there is every reason to believe that there would be a great deal more gas lighting sold to-day than is being sold.

Twenty or thirty years ago gas companies had it in their power to render a lighting service which in reliability, quality and economy would have been far beyond anything the electric light companies could render with their wasteful lamps and very unreliable service. The door, however, was not opened to this grand opportunity, yet even to-day the opportunities are great by adopting a selling gas lighting service policy, instead of gas for lighting.

### Gas Lighting Business Has Grown Without Much Effort on the Part of Those Who have Conducted It

The gas lighting business is a business that has grown without much effort having been made on the part of those who conducted it.

In fact, in some cases it has grown in spite of an apparent effort being made by these men to kill it.

The public has always recognized gas lighting as both good lighting and cheap lighting. Many to-day look upon it as the best lighting obtainable.

This is the case in spite of the fact that gas men have actually done many things that tend to discourage the use of gas lighting.

That gas men have at least not encouraged the use of gas lighting is shown by the transactions of gas associations. At the meeting of the Pennsylvania Gas Association, held in April, 1915, there was appointed a committee on lighting fixtures. Naturally, it was the duty of this committee to gather information about gas lighting. It received so little co-operation from gas companies, and found gas men exhibiting so little interest in gas lighting that it inserted the following paragraph in its report to the meeting held in April of this year:

"It is the opinion of your committee that the general use of gas lighting to-day is due more to the superiority of gas as an illuminant and the general recognition of its advantages, than the efforts to obtain and hold this business made by those who are vitally interested in increased sales of gas."

### Gas Men Should Not Leave it to Others to Sell Their Product

The U. S. Government has issued a book which presents a better case for gas lighting than anything that gas men have put out in recent years. In circular No. 55, of the Bureau of Standards, gas lighting is compared with other forms of illuminants, and shows up very favorably indeed. The high quality of gas lighting is shown as well as the fact that it costs only about from one-half to one-fourth as much as electric lighting, and is much cheaper than candles or kerosene oil, therefore gas mantle lamps produce the cheapest artificial light known. Gas men, therefore, should take heart and go after the lighting business far more strenuously. It should not be left to other people to sell our product.

In the gas lighting field, most companies seemed to have felt that they have done their whole duty if they have rented a few arc lamps at as high a price as it has been possible to get, and have made as few inspections per month as it was possible to make, and still hold the business. In this field the idea seems to have been, "How little can we do and how much can we get out of it?" rather than, "How can we render the very best service?"

There have been no special lighting rates. Few companies have even retained permanent lighting specialists who are capable and energetic.

It has been rather the custom to run a campaign in the fall with salesmen that are out of a job, and are willing to work for a few months on a temporary proposition.

### Gas Lighting Still Constitutes Nearly 50 Per Cent of the Total Sales of the Business

In spite of these adverse conditions, however, gas lighting still forms nearly 50 per cent of the total sales of the gas business.

It is still far more important to the gas manager than any other one class of business.

It is still paying dividends on gas securities, because of its standing in public esteem, and not because of the development work that gas men have done.

During the past thirty years, however, there have been far more powerful forces at work to displace gas lighting than there were during the first seventy years of its history. Electric lighting companies have been striving to introduce electricity.

Thirty years ago their service was extremely poor and extremely costly.

They have spared no expense to make it more reliable.

Nearly all machinery and lighting equipment has been scrapped to give place to more up-to-date and more efficient machinery and equipment.

It would be almost impossible to find in use to-day any of the machinery or lighting equipment that was used a few years ago.

Everyone can remember types of electric lamps that have now entirely disappeared from use.

With each change the cost of electric lighting has been decreased and the reliability increased. The electric man thoroughly believes in electric lighting, and he has preached it and practiced what he preached to such good effect that to-day we find the headquarters of both the National gas associations lighted with electricity rather than with gas.

The real secret of the electric man's success lies in the fact that he believes heart and soul in that which he has for sale. He believes in it so thoroughly that he is willing to back up his belief with the very best possible service. At the beginning his product was not nearly as good as that of the gas man's. To-day in spite of all the improvements that have been made gas lighting still has many advantages in its favor. It's his optimism and his faculty of securing favorable publicity for every little advance that has helped the electric man win what he has won.

### Tendency of Gas-Electric Companies to Favor Electric Lighting at Expense of Gas

In these days we find a strong tendency among combination companies to favor electric lighting at the expense of gas. This is done in spite of the fact that when electricity is used it creates a peak load on the generating station. It is this peak load that determines the size of the plant, and many thousands of dollars invested in electric plant and equipment, might be saved by encouraging the use of gas for lighting.

Electricity cannot be stored as cheaply and as satisfactorily as gas. It must be generated as used.

Yet these companies go on selling electric lighting and striving to kill gas lighting. This is done in spite of the fact that it is possible to greatly improve the load factor and increase the profits of the electric system by selling all the gas lighting that it is possible to sell. The lighting load can usually be carried much more economically from the gas works than it can from the electric generating station.

Another reason why it would pay to carry a goodly share of the lighting load on the gas mains lies in the very unstable character of electric lighting. Changes in styles and in lamp efficiencies are frequent. An installation made this year may be out of date next year. This means constant expense to both the light user and the electric light company. If the lighting load of combination companies could be shifted more to gas, the lighting revenue would be far more secure than it is to-day. There would be far less worry about losing a dangerous portion of it due to some whim of fashion or a new discovery, or the installation of isolated plants.

### Maximum Returns Cannot Be Expected From a Combination Plant if Gas Lighting is Neglected

The maximum returns cannot be expected from a combination plant if gas lighting is neglected. This is true for two reasons. First, it is only through an intelligent development of gas lighting that the load factor on the electric generating station can be brought up to the highest point. Second, the instability of electric lighting suggests to the wise business man the caution of dividing the lighting load between gas and electricity. At the present time conditions would suggest favoring gas. Unless this policy is followed both the gas and the electric business is bound to suffer as far as net profits are concerned.

### Importance of Service

In the gas business we must give better lighting service. Business to-day is built on the service idea.

The gas man must not be satisfied when he has installed a gas arc and is inspecting it once or twice a month. He must go farther than this and establish a department for the inspection and maintenance of every gas lamp that gas is supplied to.

It is not enough to offer to give service. You must insist on giving all a good lighting service.

Every gas lamp in your city that is in bad order reflects discredit on the commodity you have to sell, and discourages its further use, no matter if the neglect is the fault of your consumer.

As a part of good service each gas company needs a permanent department of capable lighting specialists.

It is a very grave mistake to think that gas lighting is a seasonable business and that it must be handled by a temporary force. It is not nearly as seasonable as the automobile business, or the coal business.

Everyone does not operate his automobile or burn coal the year round, but everyone does use light the year round.

There are some classes of gas lighting that are actually better in summer than in winter. If the gas company will use as much judgment as the coal men, the gas lighting department can be kept practically as busy in what are now supposed to be off seasons as in busy seasons.

Offer people an incentive to install their new equipment when it is most convenient to install it, just as the coal man offers incentives to put in the year's supply of coal at the time of the year when it is most convenient to do so, and you will be surprised to find how busy you are all summer. You will be surprised to find how little difference there is between the summer and the winter business. You will then never think of returning to the old plan of temporary salesmen and busy winter seasons.

Another feature of good gas lighting that is worthy of your careful study is free maintenance, that is, including the cost of maintaining the lamps in the gas rates just as the electric light companies do in their electric rates.

The people of the North American continent do not like to receive a lot of different bills. One of the strongest arguments the electric man has is that his service is all charged for in one bill and the customer knows from month to month just what it costs.

### Danger to Gas Business in Increased Peak Loads of Electric Companies

If we intend to advance in the gas business we must exert every effort to hold our share of the lighting business, because if we were to lose the lighting business, and it be taken over by the electric company, it would force such companies to double or treble their present plant to take care of a greatly increased percentage in the lighting load, and would leave them with a very large and expensive electrical plant idle twenty hours or more every day. Then there would be a greater incentive for the electric company to increase its day load by offering very low rates for domestic heating purposes.

If we are to prevent this we must sell gas lighting. We cannot depend solely on the fuel load. That is possibly in greater danger than the lighting load because people have not been using gas fuel for a hundred years, and it will be easier to persuade them to use a new form of heat than it has been to persuade them to use a new form of light. How real this new competition is, is indicated by the following taken from a New York City newspaper:

"Modern apartment houses which depend entirely on electricity for cooking are now being built. In each of the ninety-five apartments in Carleton Court, Buffalo, N. Y., the owner has installed an electric range for the tenants. Each apartment is further equipped with an electrically operated refrigerator, so that electric service includes heat, cooking and refrigeration, as well as light."

And remember this installation was made in Buffalo, N. Y., where they supply natural gas at 30 cents per 1000 cu. ft., so that the price of commodity is not the controlling factor.

### Gas Lighting Holds Its Own On Account of Its Superiority Rather Than Due to the Efforts of Gas Men

Much time, effort and money has been expended in building up the fuel business the gas companies now have. As a result of all the efforts a revenue nearly equal to the gas lighting revenue has been built up.

According to the opinions of gas men themselves, gas lighting holds its own on account of the public recognition of its superiority more than to any effort put forth by gas men. This being the case what could we expect if gas lighting was given a fair show?

What would be the result if an intelligent, determined effort was made to build up a gas lighting business?

Suppose nothing was done to discourage its use.

Let every gas man take gas lighting seriously. Let him use it exclusively in his own home. Let him learn all the good things about it, and learn how to remedy all the weak points in the service.

Just as soon as we can all bring ourselves to firmly believe in this branch of our business, the branch that the public still has great confidence in, and that even the United States Government has given a good name, we will hear no more talk about gas lighting being a back number, or of gas companies losing gas lighting.

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## Is Gas for Lighting a Back Number?

Is gas for lighting a back number? J. P. Conroy, in his address before the Canadian Gas Association—abstracted on p. 118 of this issue, declares most emphatically that it is not, and furnishes some very convincing proofs in support of his contentions.

It is surprising, in view of the fact that almost fifty per cent of the gas manufactured in the country is used for lighting purposes, that so large a number of gas men—though with decided electric predilections and connected with combination companies—are so free in expressing the opinion that gas for lighting is a dead issue—a thing of the past. Mr. Conroy demonstrates that if such were the case, even the combination companies would be affected adversely in the way of dividends. It is to the advantage of all to promote the use of gas for lighting in every place where its merits entitle it to be used.

Gas for lighting has many advantages. It is the most economical light, and, for that reason, if no other, its use should be advocated for all the users to whom a fraction of a dollar saved on the monthly lighting bill is a factor worthy of consideration; which means, practically, in the majority of cases. This is but a matter of good business policy. As long as the lighting bill is a burden to the average consumer, just so long will rate-lowering agitation continue to be popular. Whether the rate be just or unjust, whether the company be earning a reasonable profit or not, so long as the majority of the population is strained to keep up with its monthly bills, the public will fall easy prey to the demagogue who seeks to attain a political post by hounding the utilities. This is but a matter of human nature.

Then, too, there is the matter of the value of the illuminating agents. In some classes of work the light shed by the gas mantle and certain types of lamps has a decidedly beneficial effect on the eyes, as compared to electric light. In certain kinds of work, such as a particular branch of photography, for instance, alternating current electricity has an injurious effect. Without going into the scientific reasons for the preference, many laymen use electricity in their halls and bedrooms, but gas mantle lamps in their libraries and studies, on the ground that in such places the eye is most apt to be strained.

When the science of illuminating engineering has become established on a firmer footing than it is to-day, we will be able to make finer distinctions in the matter of lighting. Gas or electricity will be selected in many cases, regardless of cost, for certain specific reasons. In the meantime it behooves both the gas companies and the combination companies to look more closely into the matter of their gas lighting business.

This journal is an ardent advocate of gas for industrial fuel uses, but in an expansive rather than in a retrenchment sense.

The gas industry already has a large share of the lighting business. It has obtained it almost without effort or studied publicity. It should therefore be easy to hold it, and, with a little effort, and constant improvements in lamps, to increase it materially. The industrial fuel branch is to a large extent a new and almost virgin field. It will take a greater effort to build it up. There is no reason, however, why we should sacrifice what we already have to get something we would like to have. There is intelligence and enthusiasm enough in the industry to push both ends in the only manner in which they can be pushed successfully; that is with whole-hearted enthusiasm.

## What the Gas Industry has to Fear in the Full Development of the Country's Hydroelectric Possibilities

Some gas men look with dread to the day when the hydroelectric possibilities of the country will be fully developed. In such development they see the doom of the gas industry.

Such men fear without reason or without even a casual knowledge of what such development means.

Judging from their statements, one would infer that electricity can be developed from water power at practically no cost. Such a belief is absurd. The generating of electricity by water power in this country is a relatively expensive proposition.

A river with a reasonable fall and an inexpensive dam do not constitute a hydroelectric development.

There is usually a thorough and expensive investigation preceding it. The dam is quite frequently a costly affair. Then there are the headworks and canals, the penstocks and surge tanks, the power house and its expensive equipment, the discharge end, and a long and expensive transmission system.

These are most often built in difficult and inaccessible regions, and cost considerably more to construct than they would in settled and developed sections.

Sometimes the mere preparations to begin work cost considerable sums of money; enough in fact to build several small gas plants.

The primary cost of a hydroelectric power station of any size represents a large sum of money, and the interest on the capital invested alone constitutes a big annual charge.

In addition there is the maintenance; not an insignificant factor by any means.

In some of the plants, in the Northwestern section of the country, for instance, there is the necessity of removing foreign materials, such as sand, silt and even large stones, from the water before it reaches the turbines. This represents a task of considerable magnitude and means often continuous dredging in the storage reservoirs.

The canals must be maintained. Provision against ice damage in winter accounts for another expense. Canal banks sometimes are washed out. Dams have to be repaired. Canals and reservoirs have to be frequently cleaned. The machinery in the power station does not run without attention, and depreciation is an item to be considered. Transmission lines often suffer from inclement weather conditions, and, more important than all, the current can by no means be transmitted unlimited distances, and it must be used as generated. A 1,000,000-hp. plant at Seattle (Wash.) would have no effect on the power situation in New York City.

The dread—if such there be—of a greater development of the hydroelectric possibilities of the country on the part of the gas industry is without a reasonable foundation.

## Need of Higher Pressures

Electric light companies have supplied current to their consumers for lighting purposes at pressures as low as 50 volts. This low voltage, however, was not used for many years. The most common pressure at present is 110 volts, though there are companies selling current for commercial and domestic lighting at pressures as high as 250 volts. Nearly every electric company has rules against the installation of motors of capacities of one horse power or over on 110 volt lines. The pressures ordinarily used for small motors are 220 volts, 250 volts, 440 volts and 500 volts. Large motors of fifty or one hundred horse power and over are frequently installed directly on the 2,200 volt lines.

The moral of this information is that if electric light companies had not greatly increased the pressures they first used they could have never built up the profitable electric power loads they enjoy to-day. Nearly all of this load is supplied at pressures greatly in excess of the original lighting pressures. In fact most of it is supplied at pressures several times in excess of the pressures at present used for lighting.

In the gas business we find the most efficient lights require pressures considerably in excess of the ordinary gas pressures. A great deal of the industrial business requires temperatures that can only be obtained when the velocity of the gas and air in the mixing chamber of the burners is much greater than can be obtained by relying upon the gas pressure in the supply line. This necessitates giving additional pressure to either the gas or the air or to both. As a result we find in nearly every factory an air compressor as an auxiliary to the gas burner.

Where high pressure is used for distribution, especially where it is not reduced till it reaches the premises of the consumer, many of these difficulties are overcome. The high pressure gas lamp can then be used without installing a boosting station. Higher pressures can be applied to industrial burners thus giving a higher velocity to the gases in the mixing chambers, and a higher temperature at the burner. This would eliminate the air compressor in many cases where at present it is required.

The early electric lighting pressures were as low as 50 volts. Most companies now supply current for lighting at 110 volts and for motors at 220 volts, 440 volts and 2,200 volts. Gas companies are still supplying gas at pressures only sufficiently in excess of atmospheric pressure to overcome the friction of the pipes. If they had increased the burner pressure to the same extent that electric companies have, gas would now be delivered to all consumers at fifty-tenths pressure instead of twenty-five-tenths. Gas would also be supplied for industrial purposes at pressures of ½ pound, 1 pound and 5 pounds. Only actual experience with this sort of service would show how great the advantage would be. There is, however, every reason to believe that it could be made to result in as great and as profitable a revenue for the gas companies as the same practice has for electric companies.

## Greater Effort Needed in Developing Industrial Fuel Field

Great efforts are being made in the industry to develop the industrial fuel field. But even greater exertions will be required unless many excellent prospects are to be lost to other industries.

Within the past few days, for instance, a prominent manufacturer informed this journal that never once had a representative of a gas company called upon him, except to read his meter. This, despite the fact that he has been using gas for industrial purposes for the last five years, and his bills amount to several hundred dollars a year. If he had waited for the gas industry to educate him in the possibilities of its product in his factory, he would not have to-day one gas-burning appliance in the shop.

There is, in this man's experience, good reason for disquieting thoughts. He is located in a city of over 100,000 population, which is one of the livest manufacturing centers in the East. Were we to recite the range of products of the city's factories, there would be little space left on this page for other matter.

If the gas company in that city is so little alert to the possibilities that exist in this manufacturer's factory, is it not probable that it has been equally tardy in learning of the possibilities that lie in the others? Is it possible that this company has not yet awakened to the opportunities that exist for its product in the industrial fuel field? If so, it would appear that the work of the commercial gas association, and of other associations, and that of the technical and trade press in the gas field has been without effect. If such is the case in one instance, to what extent it is not true in others?

Our manufacturer was frank in stating to us that there must have been many improvements in gas burning appliances, and in their adaptations, that would have been profitable to him to have installed, with which he was not acquainted. It would have been profitable, too, to the gas company to have had him install them.

As a remedy, he suggested that gas companies establish departments to take care of just such business. In his city, the AMERICAN GAS LIGHT JOURNAL believes such an organization would pay for itself many times over—there being such a concentration and variety of manufacturing enterprises at that one point.

In general, we are convinced that the cost would be far beyond the return. We do believe, however, that, in addition to other duties, some member, or members, of the staff of the gas company in even the smallest towns should keep a directory of all factories in the town, and, that at regular intervals, a specialist should be called in for consultation in regard to advising on the possibilities of gas for the particular work underway in them.

An industrial fuel prospect undiscovered is a blot on the efficiency of the management of the gas company in the town wherein it is located. The loss of one to another industry is almost a calamity, and a misfortune to the entire gas industry.

# Cites Instances to Illustrate Wide Variety of Uses to Which Gas Can Be Put in Industrial Field

**H. E. G. Watson Answers Question as to Whether Industrial Business is Worth While—When Gas Engineers Appreciate Engineering Problems Waiting to be Solved in the Utilization Side, Business will be Gotten that To-day we Would Not Even Attempt to get**

### "Is Industrial Business Worth While?"

H. E. G. Watson, industrial agent for the Consumers' Gas Company of Toronto, Ontario, asked the question in his paper on that subject, presented at the annual convention of the Canadian Gas Association, held last week, in Quebec, and, at the end, answered it in the affirmative. A number of instances were cited to illustrate the wide applicability of gas in the industrial field. The following is an abstract of Mr. Watson's paper:

### Skepticism on the Gas Man's Part in Regard to Industrial Fuel Business

During the past few years much has been heard about the use of gas for industrial purposes. We are told what amazingly large increases in output have resulted from aggressive pushing of this end of the business. We hear of big sales ranging from a million cubic feet a month up to two million cubic feet a day. If all these statements are facts it is no wonder that many companies are making strenuous efforts to capture the business. The really astonishing thing is, considering the reward in sight, that a hundred times as much energy has not been expended for this purpose.

Why should this be? Can it be that the gas industry is asleep at the switch?

There might be many reasons given, but I believe that an important one is that right down deep in his heart, many a gas man is doubtful whether the game is worth the candle.

He reads or hears of immense consumptions gained, but he also knows that to obtain this business it has frequently required considerable expenditure of capital in the way of main extensions, large meters, services, etc. He also hears a great deal about the difficulties of not only getting, but also of holding, this business. He is frequently told that high salaried super-salesmen are necessary, and what rare birds they are.

It must be admitted that while this big business may bring in good returns, it is also, like any business, liable to be lost, and when this happens it makes a dent.

It is known that appliances having a very large hourly consumption, thus requiring extra large services and meters, sometimes have a very disappointing monthly consumption, because they are in actual use for short periods only.

Serious complaints are likely to be received concerning gas bills, pressure, heat value, etc., which are not always easy to settle in a way satisfactory to the consumer.

### Lighting Business Made the Gas Industry

Bearing in mind all these facts, we should not be too hasty to blame the conservative Canadian business man who has proved the lighting and domestic fuel proposition and holds fast to them because he knows they are good. I would be the very last one to say a word against the lighting and domestic fuel business.

We all know that the lighting business made the gas industry; that gas stoves, water heaters and gas fires have increased and strengthened it against aggressive competition.

The following instances, however, are cited to show that the advantages of an industrial fuel business may by far outweigh the disadvantages.

First there is a 1½-hp. steam boiler connected to a steam jacketed copper kettle, used for making floor wax, a mixture containing, with other ingredients, turpentine and gasoline.

Some ingenuity was required to make an installation which would be simple to operate, and safe as regards fire. The difficulty was increased as the floor space and head room were limited. The boiler was placed in a coal bin shut off by a door from the other part of the basement where the kettle was located. This installation, for which about $400.00 was charged, has been quite satisfactory to the consumer. Whether it has been equally satisfactory to the gas company is another matter. The average monthly consumption has been 3,700 cu. ft.

Another boiler, size 8-hp., was installed about the same time at a charge of $480.00. This boiler was so satisfactory that a short time ago the customer purchased a 4-hp. boiler for different work in the same factory. The 8-hp. boiler has had an average monthly consumption of 50,000 cu. ft.

### Gas Used in Coffee Roaster

It is not possible to judge the monthly bills from the size and number of appliances, as the consumption varies greatly according to the hours the appliances are in use. For instance here is a factory having a coffee roaster, an oven for drying salts, and two cauldron furnaces. The combined maximum hourly consumption of these appliances is about 1,600 cu. ft. The average monthly bill is 44,100 cu. ft.

A laboratory making bromo-seltzer, having two ovens, a 1-hp. steam boiler, and a garage heater (used for heating a room not reached by the heating system), has an average monthly consumption of 27,000 cu. ft. The manager is so well satisfied that he has actually helped us to sell appliances in other places.

Sherardizing is a process in which it is feasible to use gas as fuel, although theoretically the cost seems rather high.

A structural steel plant had for years used coke to heat rivets. The management decided to change over to oil, and placed an order for the necessary equipment. At the eleventh hour when part of the oil equipment, including a storage tank had actually been delivered, this company was won over to gas. The average monthly consumption for heating rivets and also for forges in the machine shop is 80,900 cu. ft.

A compact kitchen installation consisting of a double section hotel range, a portable oven and a toaster is giving excellent satisfaction in an institution which is practically closed during one-third of the year. In spite of this handicap the consumption averages 34,000 cu. ft. per month.

### Munition Plant Consumption Has Helped Out During War.

As an instance of some business which has helped to take up the stock during the war we might note a certain munition company which used gas for the heat treatment of schrapnel.

This company made high explosive shells for eight months, giving a consumption during that time of 20,600 cu. ft. per month. For fourteen months the consumption in the schrapnel department has averaged a little over a million cubic feet per month.

To show that an appliance which is low in price, and simple to install, may compare favorably with the more elaborate installations, we will take a firm having three candy, soda and ice cream stores located in various parts of the city. All the appliances were bought from the gas company at different times. Store number one has two candy furnaces, a sterlizing boiler and a water heater. The average monthly consumption is 48,000 cu. ft. per month.

Store number two has one candy furnace and a water heater. The average consumption is 9,500 cu. ft. per month.

Store number three has one candy furnace, a portable oven and water heater. The average consumption is 39,000 cu. ft. per month.

Thus the total consumption of this firm has been 96,500 cu. ft. per month. The customer was easy to sell and has made only a few complaints which were easily satisfied.

Another example is a company which had five coal-fired baking ovens. We were allowed to put gas burners in two of them. The average monthly consumption on these two ovens has been a little over a million cubic feet per month. This company has recently erected a new factory with six gas fired ovens (not yet in operation), so we may reasonably conclude that gas has been satisfactory.

### Industrial Fuel Business Is Well Worth While

I think almost every one reading over the figures shown in these cases (which, by the way, are not hand picked) would conclude that, in spite of some disadvantages, the industrial fuel business is well worth while.

I may be mistaken, but I am inclined to believe that many gas engineers, and with some reason, look upon the efforts of the industrial gas man with about the same spirit that an indulgent father looks upon the gambols of a sprightly child.

When these engineers see that there are really serious engineering problems waiting to be solved on the utilization side of the gas industry, I believe that we shall be getting business that today we would not even attempt to get.

# Items of Interest from Various Localities.

## Timely Featuring of Gas Incinerator in New Jersey

The Public Service Gas Company, at its Trenton, N. J., appliance store, is featuring the Rickett gas incinerator, which it is selling on terms, at $39—$3 down and $3 per month. Garbage can be placed in the receptacle and burned every 48 hours at a cost of only about three cents.

The sale is opportune, now that the epidemic of infantile paralysis is emphasizing the need of the utmost care in all measures pertaining to sanitation.

## Gas Used in "Automat" Restaurants

Gas is the sole heating agent in four new lunch rooms of a novel type, now being put in at Boston, Mass., by the Automat Lunch Company of New England. The service is "automatic," hence the name, and consists of shelves with doors, which are released on the insertion of the proper coin, allowing the patron to select the dishes he desires, and procure them without further ado than putting a nickel, or other coin, in the slot.

A large section of the shelves is for hot dishes, and which are kept hot by a steam jacket surrounding the shelves. Jacket and shelves are in the form of a cylinder, which has four or five shelves in a tier. Steam circulating in the cylinder is produced by a gas jet beneath.

Gas stoves, griddles and hot plates provide means for cooking and keeping hot the special orders. These appliances were furnished by the Boston Consolidated Gas Company.

## Citizens of Sioux Falls, S. D., Turn Down Municipal Utility Plants Project

A proposal to issue $350,000 bonds for a municipal gas plant, and $350,000 bonds for a municipal electric plant, initiated by former Senator R. F. Pettigrew, has been decisively defeated by the voters of Sioux Falls, S. D.

## Lake Charles Railway, Light & Water Works Company Takes Over Lake Charles Gas Company

The Lake Charles Railway, Light & Waterworks Company has acquired a majority interest in the stock of the Lake Charles Gas Company, organized to take over the gas plant erected at Lake Charles, La., last winter. Stockholders in the utilities company own 1,023 shares of the 2,000 shares of stock in the gas company, according to a list of stockholders appended to the charter. The names of J. C. Fessler and J. G. Boyle, organizers of the company, do not appear in the list. Mr. Boyle announces that he will be in entire charge of the gas business. The company is capitalized at $200,000.

## Industrial Fuel Campaign at Knoxville, Tenn., Meeting with Success

The industrial fuel campaign which is now being conducted at Knoxville, Tenn., is meeting with marked success, according to Henry O. Loebell, head of the combustion department, of Henry L. Doherty & Company.

Following the recent installation of a complete gas outfit in the Seilaz Cafe, by the Knoxville Gas Company of that city, J. F. Trexler, a member of the Doherty squad, expects to change all cafes over to gas by the end of August.

F. M. Rosenkranz also of the combustion squad, has a novel gas installation. The Swann Company, which conducts a bakery in the city, has a rotary oven for baking purposes, and Mr. Rosenkranz succeeded in having this company change over from coal to gas. The capacity of the ovens is 10,000 loaves of bread a day. The Burns Bakery also changed from coal to gas.

## Expect Belt Loop Will Relieve Pressure Difficulties at Flint, Mich.

**Proposed New City Gas Ordinance Given a Hearing—Gas Must Have Average Calorific Value of 590 British Thermal Units**

The proposed city ordinance at Flint, Mich., fixing the standard of quality, the pressure of gas and the appointment of a gas and meter inspector was given an open hearing at the meeting of the ordinance committee of the Common Council of that city held Aug. 9, in the Mayor's office.

### Gas Company Requests Changes

F. A. Beard, manager of the Michigan Light Company which is now furnishing the city with gas, represented his company at the meeting and made a few requests for changes in the reading of the ordinance as he said one section in particular was too rigid, and that his company would be unable to live up to it if it was left as it was. He stated that the pressure of gas in the mains in Flint varied from time to time and that it was impossible, under present conditions, to maintain the equalized pressure which the ordinance demanded.

"We are frank to admit that we are unable to cope with the growth of Flint," said Mr. Beard. "The distribution of gas is so large in Flint that, with our present equipment, we are unable to maintain a normal pressure. During the hours when meals are being prepared in all parts of the city the demand for gas reduces the pressure in the mains, and, then, as these hours pass, the pressure returns to normal.

### Expect Belt Loop Will Relieve Situation

"We are now undertaking a plan that will, I believe, relieve the situation. We are planning a belt loop about the city and now have the work well under way. This will give Flint a standard pressure of gas at all times, free from the variations that now come so frequently."

In order to comply with the proposed ordinance, manufacturers of gas to be furnished Flint for heating, power and illuminating purposes, must produce a product that will have a monthly average calorific value of 590 British Thermal Units as determined by a standard calorimeter. It is not to have a minimum heating value less than 550 units and is to be kept as near as possible 600 British Thermal Units per cubic foot. The ordinance makes proper provision against too much pressure in the mains and rules against taking a service to a consumer off a high pressure main unless the service pipe has been equipped with a special governor.

### Meters To Be Removed in Presence of City Inspector

The city gas and meter inspector is required to make tests each week relative to its calorific value and its water pressure. Records are to be maintained of these tests, and a weekly average submitted to the Common Council. The tests are to be made at fixed points along the mains within a mile from the gas plant. The gas companies may have a representative present when the tests are made if they so choose.

Consumers wishing meters inspected will be required to make a deposit of $1 with the city clerk but if the meter is found to be two per cent or more "fast," according to the provisions of the ordinance, the fee will be refunded to the consumer. The meters, when inspected, are to be removed from their sockets by an employee of the company in the presence of the city inspector who is to test them.

Manufactured gas distributed in Flint, according to the ordinance, shall contain not more than 30 grains of total sulphur, five grains of ammonia in each 100 cu. ft. and not more than a trace of hydrogen-sulphide. This is to be determined by tests made by the city inspector. Provision is also made requiring gas companies to give gas connections to applicants who meet the requirements of the ordinance.

# Lone Star Gas Company Takes Exception to Report of Professor Bemis

As was indicated in these columns in last week's issue, the Lone Star Gas Company of Texas, is not inclined to accept at its face value the report of Prof. E. W. Bemis. Its objections have taken the form of a publicity campaign to place the facts, from the company's point of view, before the people. The accompanying illustration is a reproduction of a large advertisement published in a local newspaper. In a letter to the AMERICAN GAS LIGHT JOURNAL, L. B. Denning, president of the Lone Star Gas Company, explains the situation as follows:

"Professor E. W. Bemis has been in the employ of the City of Dallas for some time for the purpose of assisting the Mayor and City Commission to arrive at a solution of certain traction, light and natural gas troubles, which the city authorities thought they had on their hands. The Mayor demanded of the Lone Star Gas Company, the company supplying natural gas in the town, that it arbitrarily reduce the price charged, 10 cents per thousand cubic feet, which demand was based upon the report of Professor Bemis. This demand the company could not and did not concede. We conducted a campaign of publicity on the gas question, carrying the whole matter direct to the consumers, and, I am pleased to say, were completely successful. You may be interested in the inclosed copy of advertisement which we directed to Mr. Bemis, and which proved the most effective instrument we used."

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# To Professor E. W. Bemis:

**You have been engaged for some time in investigating the natural gas situation in Dallas, and you are attempting to say to the public of Dallas and to this Company what should be done, what price should be charged and how this Company should conduct its business. You have filed a report advising the city, which has been published and read by the public.**

**We charge that the report contains glaring errors, misleading statements of fact and wrong conclusions. In this situation, this Company is vitally affected by your advice, and the public and the Company are interested in knowing your fitness and competency.**

**Should not the people of Dallas be fully informed as to your knowledge, skill and experience of the natural gas business?**

Did you not represent the City of Ashtabula, Ohio, in a natural gas rate proceeding before the Public Utilities Commission of Ohio?

Did you not, on June 28, 1916, testify under oath in that case that you had no experience whatsoever in the organization, operation or management of a natural gas producing company, and that all the knowledge you had was gained by talking with men in the business and from reading books?

Did you not also testify in this same case that you had not made an examination or valuation of the property of the Lone Star Gas Co?

Is it not true that neither you nor any one representing you has ever made any inspection or examinatio 1 of a single gas well, pipe line, compressor station, or gas lease of Lone Star Gas Company?

Is it not true that the courts have universally held that what a public utility company is entitled to earn is a FAIR RETURN UPON THE VALUE OF THE COMPANY'S PROPERTY AT THE TIME THE INVESTIGATION FOR RATE-MAKNG PURPOSES IS BEING HELD? This being the law, and you admitted on June 28, 1916, that you had not made a valuation of this Company's property, how can you say to the people of Dallas what the prize of gas should be?

You were connected with the Des Moines Gas case, and did not Judge Robert Sloan, who heard the testimony and rendered the opinion in this case on April 4, 1912, say of you:

> "His (Bemis) estimate of the value of the property is $1,600,000.00, but made without investigating the plant, but rather from the evidence in the case. In my judgment, he is not a competent witness thereon and hence, not considered upon that question. He has gone quite extensively into statistics and in a very intelligent and comprehensive manner, but, granting that such evidence is competent, it became evident to me that they are not reliable when accuracy becomes necessary. They may very properly be consulted when we are simply seeking approximate results, but not when accuracy is required."

Did not Judge Sloan in his report fix the value of the plant at $2,100,000.00, or 31% more than your value?

Was not this decision of Judge Sloan afterward affirmed by the Supreme Court of the United States as reported in Vol. 238, U. S. Supreme Court Reports, page 153?

Were you not connected with the Buffalo Gas case in 1913 before the New York Public Service Commission as reported in Vol. 3, p. 654 of the Commission's Reports? Before this case was brought, was not the city paying 70c per thousand for gas and after the hearing by the Commission, and after you as representing the city had recommended a reduction in price, did not the Commission fix a price of 90c per thousand?

Were you not connected with the Saginaw, Mich., case, and did you not there recommend a rate of 90c per thousand for gas, and did not the Court (on pages 36 and 37 of the opinion by Circuit Judge Gage, Nov. 23, 1908, 10 Judicial Circuit, Michigan) hold that a 90c rate was too low?

Were you not connected with the Passaic Gas case before the New Jersey Public Utilities Commission in 1912? Did you not place the item of development expense in this case, as reported on page 474, Vol. 1 of the Commission's Reports, at $171,000.00, and did not the Commission allow for this same item $1,002,500.00, or 5.8 times your value?

Did not the Supreme Court of New Jersey affirm the Commission's decision in this case as reported in 94 Atlantic Reporter, page 634?

Did you not place the value of the property of the Ashtabula Gas Company at $212,000.00, and did not the Public Utilities Commission of Ohio place a value of $292,000.00 on the same property, or an increase of 37% over your value?

Did you not place the value of the property of the Springfield, Illinois Gas Company at $588,000.00, and did not the Utilities Commission of Illinois, as reported in P. U. R. 1916 C, page 281, March 9, 1916, place a value on the same property of $744,000.00, or an increase of 26% over your value?

You were connected with the investigation of the New York Telephone Company before the Public Service Commission of New York, Second District, in 1915. Did you not place a value on the company's property of $62,000,000.00, and did not the Commission place a value on the same property of $84,000,000.00, or an increase of 35% over your value?

You were connected with the investigation of the Baltimore Gas Company in 1913. Did you not place the value of the company's property for rate-making purposes at $15,512,000.00, and did not the Commission place a value on the same property of $25,335,000.00, or an increase of 63% over your value?

**IF YOU WERE SERIOUSLY INJURED AND IT BECAME NECESSARY TO PERFORM A DANGEROUS SURGICAL OPERATION TO SAVE YOUR LIFE, WOULD YOU EMPLOY A SURGEON WHOSE ONLY KNOWLEDGE OF SUCH AN OPERATION HAD BEEN OBTAINED FROM BOOKS, OR WOULD YOU EMPLOY THE BEST, MOST SKILLFUL AND EXPERIENCED SURGEON YOU COULD OBTAIN?**

## Lone Star Gas Company

# Canadian Gas Association Gathers in Convention at Quebec

**Paper on Gas Lighting Service Evokes Considerable Discussion—Convention Party Sees Quebec Bridge—James P. King, Manager of the Stratford Gas Company, Elected President for the Ensuing Year**

In attendance at what was conceded to be the best first day's session of any convention of the Canadian Gas Association ever held in its history, members and friends of that body assembled for the ninth annual meeting at Quebec, Canada, Aug. 16.

From far and near came members and friends, and all agreed that the Canadian gas men knew how to entertain those who are doing the best they can towards developing gas interests.

The greater number of delegates took advantage of the special fare arrangements made for them over the Canada steamship lines from Toronto, and everything went along in excellent shape. Sixty-five members and guests—the ladies in the party numbered about 35—made the boat trip.

The trip through the Thousand Islands and the Rapids of the St. Lawrence river proved a delightful part of the journey.

Many familiar faces were to be found among the delegates from the United States, including: H. L. Schutt, C. F. Mason, H. D. Schall, Vernon Baker, J. P. Conroy, Harry P. Dains, Seymour Whitley, J. H. Landreth, W. H. West, Tom Hulsey and Leigh Wickham.

George W. Allen, the new secretary-treasurer of the association, was active morning, noon and night, and did his best to make every one feel easy about boat reservations, etc. The president of the association, R. A. Wallace, assisted by able assistants, of the Quebec Railway Light & Power Company, went to a great deal of trouble and expense to entertain those in attendance.

The whole of the morning of the first day was given over to the registration of visitors, the address of welcome given by H. E. Lavigueur, Mayor of the City of Quebec, the reading of the minutes of last annual convention, the reading of the secretary-treasurer's and the executive committee reports, President Wallace's address, the appointing of the nominating committee, the election of officers for the ensuing year and the reading and discussion of the paper on "Gas Lighting Service" by J. P. Conroy, manager of the General Gas Light Company, and that on the subject of "Is Industrial Fuel Business Worth While?" by H. E. G. Watson of the Toronto Gas Company, both published elsewhere in this issue.

The nominating committee returned the following draft of officers for the year 1916-17, which was put to a vote and carried: President, James P. King, manager of the Stratford Gas Company, Stratford, Ont.; vice-president, James M. H. Young, manager of the City Gas Company, London, Ont.; second vice-president, C. C. Folger, manager of the Kingston Public Utilities Company, Kingston, Ont.; secretary-treasurer, George W. Allen, advertising manager of the Consumers Gas Company, Toronto, Ont.

The following were appointed to act on the executive committee: Arthur Hewitt, general manager of the Consumers Gas Company, Toronto, Ont.; R. A. Wallace, Quebec; J. S. Norris, general manager of the Montreal Light, Heat & Power Company, Montreal, Que.; A. A. Dion, general superintendent of the Ottawa Electric Company, Ottawa, Ont.; F. A. Gardner, Belleville, Ont.; S. McIntyre, Berlin, Ont.

The paper by J. P. Conroy on gas lighting evoked considerable discussion which brought out many points surrounding the development end of the gas lighting business.

H. E. G. Watson's industrial fuel paper, illustrated as it was by a number of lantern views, also gave rise to discussion.

The afternoon of the first day was given over to a sight seeing tour. The Quebec Railway Light & Power Company reserved two observation cars for the purpose, and a trip was made over one of the most interesting and highly historical cities on the continent.

The party never before saw such a wonderful series and range of every sort of street in the world, one of the streets shown being the narrowest in the world. Quebec also holds the distinction of being the only walled city in America.

After the railway journey the party took advantage of a trip on one of the Government boats up the St. Lawrence river to look at the new government railway bridge now nearing completion across the St. Lawrence. This bridge is to have the longest single span bridge in the world, and to the visitors proved a sight well worth going many miles to see.

## Cambridge Gas Company Distributes $11,500-Share of Profits Among Employees

The Cambridge Gas Company of Cambridge, Mass., July 29, distributed $11,500 among its employees through its profit sharing system. This is the fifth year the system has been in force.

## Gas Adopted for School Heating at Enid, Okla.

The Board of Education of Enid, Okla., has decided to use natural gas for heating the schools this winter.

## New Generators Fired at Alton, Ill.

The new generators, which add 25 per cent to the gas output of the Alton (Ill.) Gas & Electric Company, were fired for the first time, Aug. 6.

## Utility Plants to a Value of $300,000,000 to be Built in Russia

Agents, authorized to buy enormous quantities of materials with which to build public utilities plants in Russia, are already in this country, according to an announcement made by W. Aiseman, chief of the Russian Trade Division of the National Association of Manufacturers. The projected developments include water works, gas works, electric light plants, electric railroads, etc. It is estimated that the total cost will be approximately $300,000,000.

## New England Company Produces 5,000 lb. of Picric Acid Daily

The New England Manufacturing Company, in which Massachusetts Gas Companies has a half interest through ownership of 1,000 shares, is now producing daily about 5,000 pounds of picric acid, which is being sent mostly abroad under paid contracts with foreign Governments. The company issues no statement of earnings, but the daily net profit of the present output is estimated at $5,000.

## Beehive Coke Production in July Almost 3,000 Tons Less Than that in June

The following is a statement of car loads of bituminous coal and beehive coke that originated on 49 railroads in July, 1916, compiled from reports received by the U. S. Geological Survey by noon, August 15.

COMPARATIVE FIGURES BASED ON REPORTS OF 49 ROADS FOR JULY, 1916.

| | July, 1916 | June, 1916 | July, 1915 |
|---|---|---|---|
| Carloads of bituminous coal..... | 376,775 | 380,041 | 364,396 |
| Carloads of beehive coke..... | 47,569 | 50,102 | 46,110 |

## Niagara Plant Increases Gas Capacity

The Niagara Light, Heat & Power Company, operated by Henry L. Doherty & Company at Tonawanda, N. Y., has completed the installation of a new gas bench which will add about 20 per cent to its production capacity.

## Massachusetts Commission Names Companies for Calorific Tests

In addition to the companies mentioned in the AMERICAN GAS LIGHT JOURNAL, Aug. 7, the Massachusetts Gas & Electric Light Commission has designated the following plants for tests on calorific measurements of gas: Boston, Brockton, Cambridge, Charlestown, Fall River, Fitchburg, Haverhill, Holyoke, Lowell, Malden, New Bedford, Old Colony, Salem, Springfield, and Worcester.

As required by the board, these companies are installing calorimeters, at their own cost, for their own and the board's inspectors' use in making the tests. The company will make weekly reports to the board, both of the B. t. u. s. produced in the gas, and of the history of the gas made. The inspectors will visit the plants at odd intervals, as under the former practice, and make tests for both candle-power and B. t. u. s.

Thus far, six of the nineteen companies designated for tests have installed their calorimeters, and one more company is about to install.

After about six months, the commission will consider the results obtained with a view of fixing the minimum of thermal units, which will be required to companies and municipal plants in the state.

## Desires to Adopt Sliding Scale Rate at Fort Wayne

The Indiana Public Service Commission, Aug. 4, received a petition from the Northern Gas & Electric Company, asking permission to decrease its rates for gas at Fort Wayne.

The Company asks approval of a new schedule of rates, to become effective, Sept. 1, under which the maximum price for gas will be 85 cents net, and the minimum will be 45 cents net; the latter price being for each thousand cubic feet over the first 500,000 cu. ft. used each month.

The proposed new rates are offered to stimulate the use of gas by large consumers.

## Providence, R. I., Sells 3,500 Old Gas Lamps

Public Service Engineer Brunet, of Providence, R. I., at the direction of the City Council Lighting Committee, recently sold to the John H. Higgins Company, of that city, 3,500 old gas lamp fixture frames which for more than a year had laid in the city yard awaiting disposal.

The iron lamp posts were sold a long time ago, but the lamp holders, of glass set in copper and tin frames, were left. With copper bringing a higher price than ever, the frames have been sold. Thirty-one cents apiece was given for them, and the deal netted the city nearly $1,000.

## Question Legality of Amount of Deposit Required in Dayton

Question has been raised by city officials of Dayton, Ohio, on the legality of the rule which has obtained with the Dayton Gas Company for several years relative to the remanding of a $10 deposit from tenants of rented houses before gas is turned on.

City Manager Waite sent a letter, Aug. 7, to the gas company citing sections of the city ordinances which do not allow the gas company to demand as a deposit more than the amount of the average rate per month of the consumer, plus 30 per cent.

City Attorney McConnaughey is of the opinion that $10 greatly exceeds this amount and has asked the company to make a report.

## Natural Gas Supply Shut-Off from Mills in North Texas

Notice was served, Aug. 4, on large manufacturing plants of Dallas, by the Dallas Gas Company, distributors for the Lone Star Gas Company, that on Sept. 1, gas for use under boilers will be shut off. Plants in Sherman, Denison, McKinney, Fort Worth and other cities have been receiving gas from the same company. It is estimated that 70 Dallas factories will be affected by the order. It is said that the action was taken by the company in order to conserve the supply.

## Natural Gas Rates Raised in Kansas City

Increased rates for natural gas in Kansas City were announced, Aug. 8, with the receipt of a letter by Jacob Herzfeld, city counselor, addressed to the Kansas City Gas Company by John M. Landon, receiver for the Kansas Natural Gas Company.

The proposed rate will impose a monthly minimum charge of one dollar which will cover the first two thousand cubic feet of gas consumed. Thereafter gas will be charged for at the rate of 38 cents a thousand feet. The present rate is 27 cents.

## Kansas Will Fight Raise in Rates for Natural Gas

Declaring the new rate of 35 cents a thousand cubic feet for gas, which was announced by John Lanson, receiver for the Kansas Natural Gas Company to "be unjustifiable and exorbitant," Gov. Capper announced, Aug. 8, that the state would do all in its power to block the raise. Gov. Capper conferred with Attorney General S. M. Brewster, late in the day, to see what could be done in the matter.

## Five Per Cent Cut Made in Gardner Gas Rates

A new rate schedule based on a guarantee by consumers to use a definite amount of gas, was announced, Aug. 9, by Manager R. B. Smith of the Gardner Gas Light & Fuel Company of Gardner, Mass.

The consumer who guarantees to use 1,000 feet a month will be billed at $1.85 gross or $1.75 net, a reduction of 5 cents per 1,000 from the old schedule.

Consumers who will contract for 2,000 feet a month will be billed at $1.75 net for the first 1,000 feet and $1.50 for every subsequent 1,000. Consumers using quarter meters get the same rate, except on the minimum rate after the first 1,000 feet is consumed. For every subsequent 1,000 feet the meters will be adjusted to a rate of $1.65.

The gas company officials set the minimum rate at $1.65 for meters, which they figure is the average for the people who will contract for large amounts in the consumption of gas.

The new rate for those who pay monthly goes into effect immediately, while the new rate for meters will go into operation as soon as the meters can be adjusted.

## Georgia Railway & Power Company Installs "Perpetual Inventory System"

In order to improve its records so that it can tell at any time the exact quantity of each class of material that is on hand in the various stock rooms, the Georgia Railway & Power Company of Atlanta, Ga., has decided to install what is known as a "Perpetual Inventory System."

In connection with the installation of the system C. A. Werber has been appointed general storekeeper of the company and its allied companies, and while the store room keepers and stock clerks will continue to report to the same heads of the departments as at present, it will be necessary for Mr. Werber to have their co-operation in installing this system and maintaining the same. As Mr. Werber will report to the purchasing agent, and, will therefore keep in touch with the market prices on all classes of material, it is expected that the installation of the system, together with the proper co-operation, will enable the company to materially reduce the amount of stock carried.

In order to bring about this reduction, it is the intention to arrive at the safe maximum quantity of each class of material to be carried in the different stock rooms, these quantities too vary, depending on the market prices and the prospects of changes in prices, In cases where larger quantities are now carried than are necessary, the company, in some instances, on account of the prevailing market prices, may dispose of the excess quantities. It is also intended to make some disposition of the supplies, etc., in the different stock rooms which have become obsolete.

In order to carry out the plans as outlined above, I desire to have the heads of the different departments co-operate with Mr. Werber, and give necessary instructions to any of the employees under them who are connected with the stock rooms, or the disposition of supplies in any way.

## Number of Students Taking Gas Engineering Courses 1915-16 Greater Than Ever Before

During the academic year just closed not only has the number of students taking the courses in gas engineering, made possible by the generosity of the Pacific Gas Association at the University of California, been greater than ever before, but the number of courses given has been increased and the quality of work done greatly improved.

In the junior and senior years there were a total of eight courses offered primarily for students in gas engineering. Three of these were given by the department of chemistry, and the remaining five by the department of gas engineering, which is embraced within what is known as the College of Mechanics.

The total number of students taking one or more of the eight courses was approximately sixty.

The special lectures given by outside engineers in the course in gas engineering during the second half-year, January to May, 1916, there being eight of such lectures, were the best ever given in any course of this character with the possible exception of the series of lectures given during the second half-year, January to May, 1913, by E. C. Jones, of the Pacific Gas & Electric Company.

Mr. Jones' lectures were consecutive, and treated of problems of peculiar interest to the gas engineer. The series given during the second half-year 1916, however, covered a wide range of subjects, each lecture being given by a man who was a master of the particular subject treated by him.

The special laboratory for gas engineering work in the Mechanical and Electrical Engineering Building is now well equipped with apparatus and devices for the analysis of gas, determination of heat units, candle power, and investigations of such character. In addition, other laboratories of the department are available for students especially interested in gas engineering, but who desire to carry on work in steam engineering, electrical engineering and hydraulics.

The total sum received from the Pacific Coast Gas Association is $7,700, of which there has been expended directly in the equipment of the laboratory and the purchase of books $2,881.41, leaving a balance of $4,818.59 on hand which will only be expended for permanent and special equipment after consultation and approval by the committee on gas engineering of the gas association.

The following lectures were delivered in the second half-year, January to May:

OXY-ACETYLENE WELDING OF HIGH PRESSURE MAINS, By D. E. KEPPELMANN, general superintendent of gas distribution, Pacific Gas & Electric Company, San Francisco.

THE SUPERIORITY OF GAS ILLUMINATION, By C. B. BABCOCK, manager, General Gas Light Company and vice-president Pacific Coast Gas Association, San Francisco.

METHODS OF DEVELOPMENT OF PUBLIC UTILITIES, By S. WALDO COLEMAN, president, Coast Counties Gas & Electric Company, San Francisco.

THE VALUATION OF PUBLIC UTILITIES, By PAUL THELEN, assistant engineer, Railroad Commission of the State of California, San Francisco.

THE USES OF GAS IN THE INDUSTRIAL WORLD, By JOHN A. BRITTON, regent, University of California, and vice-president, Pacific Gas & Electric Company, San Francisco.

THE CONSTRUCTION OF SMALL GAS PLANTS, By VAN E. BRITTON, assistant engineer, Pacific Gas & Electric Company, San Francisco.

THE CHEMISTRY OF GAS MANUFACTURE, By E. C. JONES, chief chemist, Pacific Gas & Electric Company, San Francisco.

## Improved Appliance Company Establishes Boiler Furnace Department

The Improved Equipment Company, of Brooklyn, N Y., has added a Boiler Furnace Department to its service in the field of combustion engineering.

This new department will offer its services for the following work:

Steam boiler furnaces, hand fired.

Automatic stokers.

Forced draft equipment for all type of furnaces and stokers.

Oil, tar and gas burners and complete plants for these fuels.

Pulverized and crushed coal furnaces and apparatus.

The engineering and construction of improvements to existing plants, especially to stoker plants now operating unsatisfactorily.

## Dollar Gas at Blue Island, Ill.

The Illinois Public Utilities Commission has handed down an order reducing the gas rates at Blue Island from $1.10 to $1.00 per thousand cubic feet.

## Raise Valuation of East Ohio Gas Company

The valuation of the property of the East Ohio Gas Company throughout the state has been increased for purposes of taxation $421,100 during the past year, according to figures made public by the state tax commission. The company's property is now valued at $11,179,000.

## Lower Gas Committee Named at Salem, Mass.

President Adams of the city council of Salem, Mass., has named as the committee to work with the city solicitor for a lower gas rate: Councillors Broadhead, McGrath and Pierce. The committee will work up its case with the city solicitor, who will present the facts and figures to the board of gas and electric light commissioners.

## Massachusetts Gas Companies Are Active in Dull Season

Despite summer heat and the usual falling off in the output of gas for illuminating purposes, the summer season can often be taken advantage of to better advantage than busier seasons in pushing various kinds of gas appliances, notably those which are comfortable substitutes for old fashioned methods.

Several gas companies in Massachusetts have put in some good, earnest work the present season, with results that are highly satisfactory to the management.

The business of the Arlington Gas Light Company has increased so rapidly in the town of Belmont that a branch agency has been established there, where local customers can pay their bills and buy the smaller kinds of appliances.

A campaign conducted during the month of June by the North Adams Gas Light Company, the Adams Gas Light Company, and the Williamstown Gas Company, allied concerns operating in Western Massachusetts, resulted in the sale of 176 "I-Want-U" gas irons, and in orders for future delivery of 50 more.

A contest between the various gas companies operated by the Gas & Electric Improvement Company, Boston, Mass., for the largest percentage of sales of gas ranges and water heaters to meters already installed, continuing from March 1 to July 1, resulted in the Spencer company achieving the largest per cent for ranges, 8.63; the Clinton company second, with 5.73; the Arlington company first in heaters, with 4.26 per cent, and the Williamstown company second, with 4.17 per cent.

The Spencer Gas Company has just installed a 4 hp. and a 2 hp. gas fired Kane steam boiler, the former used in a bakery for steaming the bread during baking, and the latter used in a box factory for boiling glue. The 4 hp. boiler consumes about 300 cu. ft. per hour. In order to secure a minimum requirement of gas, the feed water is taken from a pressure boiler which supplies the bakery with hot water and is heated from the oven.

The glue boiler can boil a half barrel of glue in 20 minutes, with steam pressure at 50 lb.

# Societies and Associations

The American Chemical Society will meet in New York City, Sept. 25-30, in conjunction with the Second National Exposition of Chemical Industries. Dr. Charles H. Herty, president of the society, will open the exposition on Monday, Sept. 25, at 2 o'clock in the afternoon, with an address reviewing the history of chemistry and the chemical industries in this country, and outlining developments since the outbreak of war in Europe. The presidents of co-operating societies, such as the American Electrochemical Society, the American Institute of Mining Engineers and the American Paper and Pulp Association will follow Dr. Herty with

speeches of welcome, reviewing the progress made in the industries represented by them. The first general session of the American Chemical Society will open at Columbia University on Tuesday morning, and arrangements are being perfected for a public meeting in the large hall of the College of the City of New York on Tuesday afternoon, when addresses will be made of general public interest pertaining to the interesting developments in the field of applied chemistry during recent years. The programme of the week's meetings will provide for general conferences on subjects in which the chemists of the country are now interested, and it is intended that the lecture hall of the Grand Central Palace and Rumford Hall in the Chemists' Club building will be occupied each afternoon at the same time by one of the different divisions of the society for the discussion of such industrial topics as the production of dyestuffs, medicinal chemicals, industrial alcohol, the manufacture of paper pulp and by-products, oils and motor fuels, glassware and porcelain, steel alloy metals, new developments in chemical industries, etc. On Wednesday and Thursday mornings a general symposium on colloids will be held, theoretical considerations being discussed on the first day and the industrial applications of colloid chemistry on the second day. The American Electrochemical Society has planned a series of interesting meetings. The electrochemical group will open its meeting later in the week, on Thursday, Sept. 28, with a technical session devoted to a review of American progress in the electrochemical industry. A complimentary smoker will be held on Thursday evening, and, on Friday evening, there will be a joint banquet at the Waldorf-Astoria of the members of the American Chemical Society, the American Electrochemical Society, and the Technical Association of the Pulp and Paper Industry. This will be a subscription banquet and the price of tickets to members will be $3.50; additional tickets for guests will be obtainable at cost, or about $7.

The New Bedford Gas & Edison Light Company Employees held a clam bake at Lincoln Park, Aug. 5. More than 300 employees and friends attended.

The Pittsfield Coal Gas Company Employees to the number of about 100, held their annual outing at Hick's Grove in Berkshire, Aug. 9.

The Milwaukee Gas Light Company Employees held their annual picnic at Waukesha beach Aug. 17.

## Personal Notes

W. R. Pigg, a retired San Joaquin banker, has been elected director and vice-president of the Central California Gas Company.

David H. McCormick has resigned as manager of the Rockville Gas & Electrical Company.

George Loveland Prentiss will be in charge of the new boiler furnace department established by the Improved Appliance Company of Brooklyn, N. Y.

Wylie G. Wilson will have charge of the designing and engineering in the recently established boiler furnace department of the Improved Appliance Company of Brooklyn, N. Y.

R. K. Crane has resigned from his position as chief appliance clerk of the Peoples Gas Light & Coke Company of Chicago.

Fred K. Wells, New England representative of the Pittsburgh Water Heater Company, will be host to the gas fraternity of New England, on a deep sea fishing trip, Aug. 18. The trip will durate from 10 a. m. to 6 p. m.

L. L. Cadwallader, whose resignation as manager of the Kennebec Gas & Fuel Comany was noted in these columns last week, will in the future be connected with the Waterbury Gas Light Company, of Waterbury, Conn.

H. M. Byllesby and J. J. O'Brien, president and treasurer respectively of H. M. Byllesby & Company, are making a tour of inspection of the company's properties in Colorado. The trip will include a visit to the hydroelectric plant of the Arkansas Valley Railway, Light & Power Company at Skaguay and the steam plant at Canon City which is being enlarged, an inspection of the mining districts served by the company's power lines and an automobile trip through the Arkansas Valley which is also served electrically by the company. They will return to Chicago within a few days.

## Construction Notes

Fresno, Cal.—The San Joaquin Light and Power Company is at work on the construction of 40 miles of mains for natural gas in the neighborhood of San Luis Obispo. The gas is to be piped from the Santa Maria fields to San Luis Obispo, the Eastern Oil Refinery, Pismo, Haviland, Port San Luis and Oceano. It is expected that the work will be completed within the next month.

San Diego, Cal.—San Diego Consolidated Gas & Electric Company is constructing a brick garage and blacksmith shop adjacent to the electric plant to take care of all the company's motor vehicles. A new gas generator will also be erected, and a new gas purifier will be built in the near future.

Bristol, Conn.—Work will be started within a short time on the extension of the gas main on Broad street to the tract of the Bristol Brass Company on King street, to supply the houses of the company now in the process of erection. Gas mains will also be laid on Terryville avenue to Endee Manor to furnish light and heat for the 101 houses of the new Departure Manufacturing Company.

Macon, Ga.—The Macon Gas Company has been granted a permit to make improvements to a value of $25,000 at its plant at the lower part of Walnut street. This amount will be spent in overhauling every department of the works. New coke screening and elevated bins and a new storage trestle are being erected together with new coal installations and many other improvements.

Woodcliffe, Mich.—The Grand Rapids Gas Light Company is laying a main from Grand Rapids to Woodcliffe and East Grand Rapids.

Goldfield, Nev.—J. B. Fayant has petitioned the board of county commissioners for a franchise to construct and maintain gas mains and appliances in the streets and alleys of Goldfield.

Albany, N. Y.—Citizens residing in the vicinity of Alin and Riverside avenues requested the Albany Southern Railroad Company to put larger gas mains in these streets.

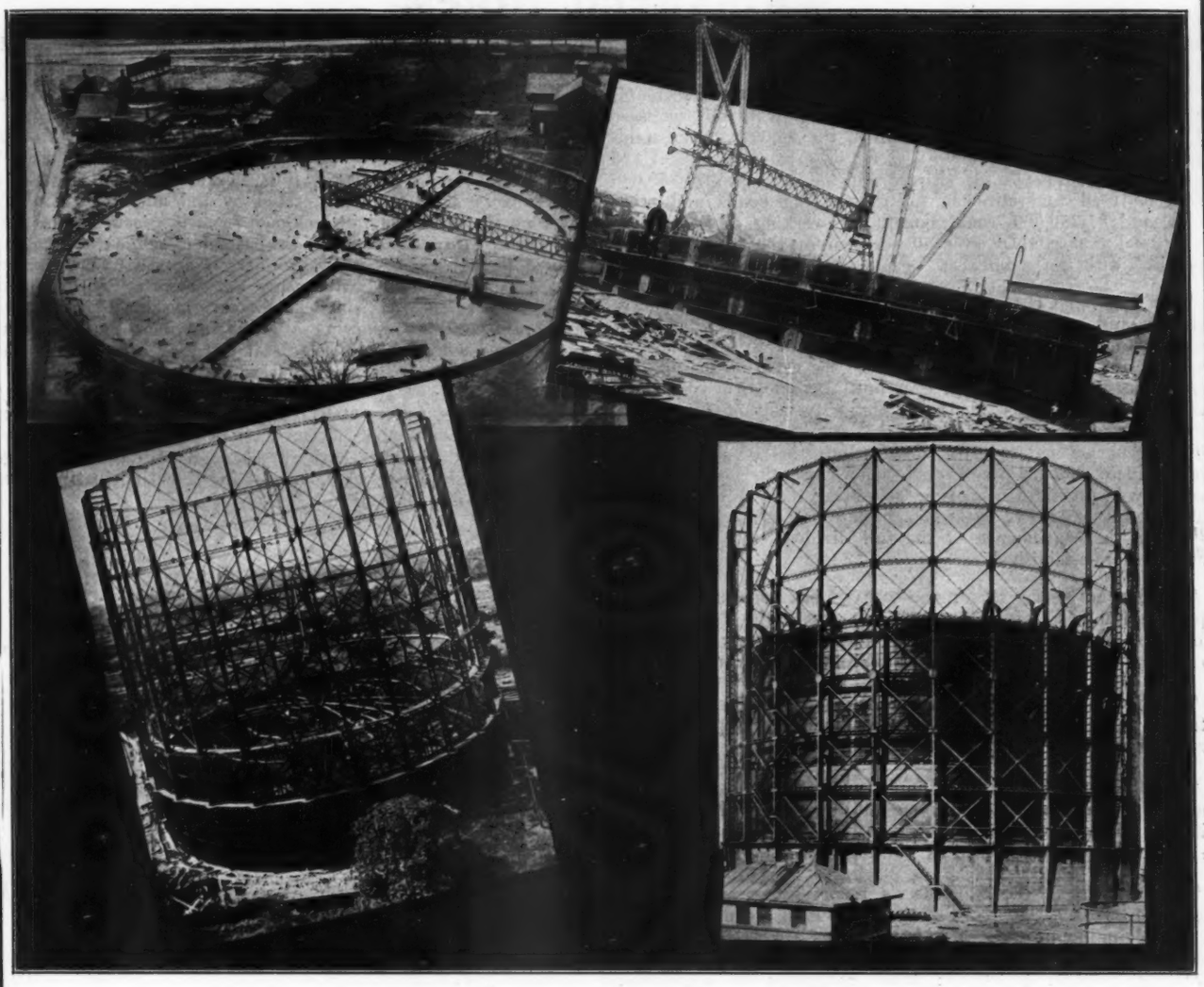
El Reno, Okla.—Work of constructing a belt line for the natural gas distributing system has been started. Everything is being done to have the system in readiness to turn natural gas into the city mains by October.

Muskogee, Okla.—A contract has been entered into by the Mayor of this city and Mussellem Oil and Gas Company, whereby the latter company will supply gas to this city. The contract provides that the city will go to work within 90 days on the construction of the municipal gas pipeline from Brushy Mountain to the city.

Clarksville, O.—The Clarksville council has granted the United Natural Gas Company permission to lay pipe in the principal street.

Multnomah, Ore.—The Portland Gas & Coke Company is at work on the necessary construction to supply the people of all the various additions in Southwestern Multnomah County. The principal main has advanced as far as Ryan Place, and the work of installing mains is progressing rapidly. Plans covering all of the important sections of Multnomah and surrounding districts, such as Primrose Acres, Queensland, Buckingham Heights, Overhill Park, Hillvale Tracts and Western View have been completed.

Brownwood, Tex.—A gas franchise has been granted the Central Texas Gas Company to enter Brownwood and furnish gas for lighting, heating and fuel.



RITER-CONLEY COMPANY

STEEL CONSTRUCTION

PITTSBURGH

HELME & McILHENNY

1339-1349 Cherry St., Philadelphia, Pa.

ESTAB. 1848 H & McI High Grade Meters

GAS METERS

HINMAN DRUM STATION METERS, FOULIS GAS GOVERNORS
PREPAYMENT METERS

REPAIRING AND CONVERTING

PROMPT SHIPMENTS - - - - - CORRESPONDENCE SOLICITED

# Financial Notes.

THE KANSAS CITY NATURAL GAS COMPANY'S plan of reorganization to be offered stockholders is said to provide for the issue of $9,000,000 new stock, in addition to the $6,000,000 outstanding. New stock is to be subscribed for by present holders at $25 a share for $50 par value shares. Of the proceeds, $3,250,000 could be used for retirement of outstanding bonds and other debts, and $1,250,000 would remain for working capital. It is understood that slightly over 50 per cent of the stock has been deposited with the committee.

THE STANDARD GAS & ELECTRIC COMPANY'S recent decline in common and preferred stocks from the year's top, which they reached not long ago is said to have been due to a decision on the part of the directors not to increase the dividend on the preferred shares from 4 to 6 per cent until December, or early next year. The company is said to be distinctly "out of the woods" now and reports are to the effect that it is earning as much as 10 per cent on the preferred stock. Nevertheless, the directors are bound to adopt a conservative policy—one that may not immediately insure the stockholders of getting their full 8 per cent on the preferred stock, but which in the long run will do much to insure the continuance of the full dividend rate when it is once more re-established.

THE EMPIRE GAS & ELECTRIC COMPANY has been authorized by up-State Public Service Commission to absorb the Central New York Gas & Electric Company, the former company to succeed to all properties, rights and franchises of the two companies.

THE UNITED FUEL GAS COMPANY has applied to the New York Stock Exchange to list $7,987,500 first mortgage 6 per cent 20 year sinking fund bonds, Series A, due 1936.

THE HOMER & CORTLAND GAS LIGHT COMPANY has been authorized by the commission to issue $25,000 of its common stock, with the proceeds of which $10,000 of outstanding liabilities will be satisfied, and $15,000 held as working capital.

THE ST. JOHNS GAS COMPANY'S report shows an operating income of $340.99, which just offsets a deficit of a similar amount at the beginning of the year. Other items are as follows: Operating revenue $4,336.50; operating expenses, $2,987.62; net operating revenue, $1,348.88; taxes assignable to operations, $902.80; uncollectable operating revenue, $105.09.

THE PORTLAND GAS & COKE COMPANY made a net income of $297,194.08 during the fiscal year ending July 1, according to a report filed with the state public service commission. Dividends on outstanding stock were paid as follows: 3½ per cent on $3,000,000 common, $105,000, and 7 per cent on $2,000,000 preferred, $140,000. The surplus for the year was $51,208.29, and there was a surplus of $68,865.70 at the beginning of the year, so the total surplus at the close of the year was $120,073.99. The following figures are taken from the report: Operating revenue, $1,320,595.22; operating expenses, $586,093.94; net operating revenue, $734,501.28; taxes assignable to operations, $110,591.56; uncollectable operating revenue, $7,630.28; operating income, $616,279.44; non-operating revenues, $5,643.71; non-operating revenue deductions, $4,796.10; net non-operating revenue, $847.61; total gross income, $617,127.05; deductions from gross income, $319,932.97

THE NORTHERN STATES POWER COMPANY reports cash sales of 7 per cent preferred stock amounting to $66,400, made to 110 of the company's customers during the month of July. This makes a total of $709,400 of the company's preferred stock now held by nearly 1,200 of the company's customers. In addition to the cash sales, a large number of partial payment sales have been made, but report on these has not yet been compiled.

THE DENVER GAS & ELECTRIC LIGHT COMPANY has called for redemption at 101, and interest, the 6 per cent secured coupon gold notes. The notes are to be paid October 1st.

THE CONSOLIDATED GAS, ELECTRIC LIGHT & POWER COMPANY'S price at which the common stock is to be offered to consumers during the next 30 days is to be fixed shortly by officials of the corporation. During the past five or six months the price to consumers has been 115, and it is intimated that there will be no change. The plan inaugurated by the management of the gas company of offering its common stock to consumers has been highly successful. Thousands of the customers of the company have availed themselves of the opportunity to acquire the stock, and it is said the demand is increasing each month. The gas company recently issued its statement of earnings for the fiscal year ended June 30 last, showing a gratifying increase in revenues as compared with the preceding fiscal year. It is understood that the company also started the new year with a gain in business.

THE LINCOLN GAS AND ELECTRIC COMPANY, ELECTRIC BOND DEPOSIT COMPANY, and MONTGOMERY LIGHT & WATER POWER COMPANY STOCKHOLDERS have agreed to the proposed exchanges of stocks of Cities Service Company for the participating issues of the companies named.

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## Current Prices of Public Utility Securities.

| | Bid | Asked |
|---|---|---|
| Adirondack Elec. P | 27 | 29 |
| Adirondack Elec. P. pf | 78 | 80 |
| *American Gas & Electric | 146 | 150 |
| *American Gas & Electric pf | 49 | 51 |
| American Light & Traction | 378 | 382 |
| American Light & Traction pf | 109 | 111 |
| American Power & Light | 69½ | 71 |
| American Power & Light pf | 84 | 86 |
| American Public Utilities | 42 | 47 |
| American Public Utilities pf | 74 | 77 |
| Amer. Water W. & Elec | 8½ | 9½ |
| Amer. W. W. & E. part'g pf | 22 | 24 |
| Amer. W. W. & E. 1st pf | 62 | 65 |
| Carolina Pow. & Lt | 27 | 31 |
| Carolina Pow. & Lt. pf | 97 | 100 |
| Cities Service | 266 | 269 |
| Cities Service pf | 85 | 86 |
| Colorado Power | 24¾ | 26 |
| Colorado Power pf | 99½ | 101½ |
| Commonwealth, Pr., Ry. & Lt | 63 | 65 |
| Commonwealth, Pr., Ry. & Lt. pf | 84 | 86 |
| Denver Gas & Electric gen. 5s | 96¾ | 97¾ |
| Electric Bond & Share pf | 100 | 103 |
| Empire District El. pf | 88½ | 92½ |
| Federal Light & Traction | 10 | 12 |
| Federal Light & Traction pf | 45 | 49 |
| Gas & Electric Securities | 200 | — |
| Gas & Electric Securities pf | 95 | 100 |
| Northern States Power | 86 | 88 |
| Northern States Power pf | 96 | 97½ |
| Pacific Gas & Electric | 58 | 58¾ |
| Pacific Gas & Electric pf | 88 | 89 |
| Republic Ry. & Light Co | 38½ | 40 |
| Republic Ry. & Light Co. pf | 75 | 77 |
| *Standard Gas & Electric | 15 | 15½ |
| *Standard Gas & Electric pf | 39½ | 40½ |
| Tennessee Ry., Light & Power | 9½ | 10½ |
| Tennessee Ry., Light & Power pf | 47 | 49 |
| Toledo Trac., Light & Power | 41 | 44 |
| Toledo Trac., Light & Power pf | 80 | 84 |
| United Light & Railways | 49 | 52 |
| United Light & Railways 1st pf | 74 | 76 |

*Par value $50